



DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT
ECONOMIC AND SCIENTIFIC POLICY **A**



Economic and Monetary Affairs

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EU Energy Independence, Security of Supply and Diversification of Sources

Study for the ITRE Committee



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

WORKSHOP

**EU Energy Independence, Security of Supply
and Diversification of Sources**

Brussels, 6 February 2017

PROCEEDINGS

Abstract

This report summarises the presentations and discussions during the workshop 'EU Energy Independence, Security of Supply and Diversification of Sources' organised on 6 February 2017 by Policy Department A for the Committee on Industry, Research and Energy (ITRE). The aim of the workshop was to evaluate the current and future EU gas import dependence and to identify and assess possible policy initiatives to enhance the security of gas supply in the EU by further diversification of sources and routes. The workshop and this report will also support the ITRE Committee in its evaluation of proposals for review of EU legislation related to this topic.

This document was requested by the European Parliament's Committee on Industry, Research and Energy.

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LIST OF ABBREVIATIONS

BEMIP	Baltic Energy Market Interconnection Plan
BCM	Billion cubic meters
CCGT	Combined Cycle Gas Turbine
CEER	Council of European Energy Regulators
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
EU	European Union
IEA	International Energy Agency
ITRE	Industry, Research and Energy
LNG	Liquefied natural gas
MS	Member State
OIES	The Oxford Institute for Energy Studies
PCI	Project of common interest
TYNDP	Ten-Year Network Development Plan

EXECUTIVE SUMMARY

The Committee on Industry, Research and Energy (ITRE) of the European Parliament organised a workshop on the 6th of February 2017 on 'EU Energy Independence, Security of Supply and Diversification of Sources'. The workshop was chaired by Mr Jerzy BUZEK and included five high level presentations by recognised external experts.

Peter Fraser, Head of the IEA Gas, Coal and Power Markets Division, pointed out that the gas demand of the EU-28 stabilised in 2015-2016 at its lowest level since 2005, but a modest recovery in demand is expected in 2017-2021 due to planned coal and nuclear plant retirements. As domestic EU production is declining, gas imports will further increase. In 2015 Russia accounted for 44 % of EU gas imports and its dominant supplier position was reinforced in 2016. The high level of LNG regasification capacity in the EU, and its access to multiple international source countries contributes to a high level of security of supply. Mr Fraser concluded that gas will continue to play an important role in the energy mix over the next decades, particularly in the power generation sector. EU gas import dependency is high but energy savings can contribute to lowering this dependence in a cost-efficient way.

Katja Yafimava, Senior Research Fellow at the Oxford Institute for Energy Studies, highlighted that global LNG and Russian pipeline gas will remain the two main sources of gas for the EU up to 2030. No significant non-Russian pipeline gas will be available for the EU before 2025, and Russian gas will be competitive with other sources in a hub-priced EU market. Abundant LNG regasification capacity is available in most EU regions. However, this capacity is limited, but expanding (with EU financial support), in Central and Southern Europe, as well as in the Baltic States. The ongoing investments, including in interconnections, will reduce the gas supply vulnerability in these regions. Mrs Yafimava concluded that the main risks to existing commercial relationships with gas suppliers are political, legal/regulatory and contractual; and that these risks should be mitigated.

Jan Ingwersen, General Manager of ENTSO-G, highlighted the fact that gas infrastructure must be designed to cope with peak demand, which is still increasing in the EU notwithstanding the stabilisation or slight decrease in gas demand. The overall gas demand is, however, still substantially higher than the electricity demand. The infrastructure investments in the EU have resulted in highly converging wholesale prices, especially in Western Europe which allows most EU Member States to have access to diversified supply sources. Additional gas infrastructure is still needed in order to improve the gas supply security and competition in the Baltic States, South-East Europe and the Iberian Peninsula. The projects required to address this shortfall in some regions are expected to be commissioned in the coming years.

Tomislav Jurekovic, Vice-President of CEER and President of the Croatian Energy Regulator, commented on the initiatives of CEER to formulate policy recommendations with regard to the EU's security of supply. CEER has, amongst other things, assessed the value of LNG in this context and concluded that LNG is a key source of gas supply diversification, but further measures could be taken (e.g. more market information and transparency) to improve the functioning of the LNG market and to enhance its contribution to security of supply. New LNG infrastructure will be primarily driven by the market, but security of supply objectives should also be considered, preferably at the regional level. In this context, he referred to the Croatian LNG terminal project, which contributes to the security of supply in the region and has received EU support as a Project of Common Interest. Mr Jurekovic finally pointed out some challenges (e.g. geopolitical evolutions, development of LNG-infrastructure) and uncertainties (e.g. gas demand evolution), which might affect the security of supply and affordability of gas in the EU.

Coby van der Linde, Director of the Clingendael International Energy Programme, stated that the EU is currently enjoying a buyers' market, with a significant oversupply of both pipeline gas and LNG, and a high level of price competition and supply security. Mrs van der Linde warned however that this favourable supply situation for the EU might not last and that the EU is not in a position to determine the nature of the market. If Asian and/or LNG business models shift to mainly short term transactions, LNG prices for the EU might go up. In this context, the EU authorities and market parties should remain vigilant in order to properly anticipate possible future international market developments, particularly in Asia.

These presentations and the subsequent interventions of ITRE members clearly showed that the various EU policy measures to enhance gas supply security, particularly the Regulation on Security of Supply and initiatives to stimulate and co-fund infrastructure Projects of Common Interest, have significantly enhanced the security of supply for gas in the EU. In most EU regions, the gas transport and LNG infrastructure is well developed and has allowed diverse sources of gas. The European gas market is in general well interconnected, which contributes to security of supply, enhanced competition and price convergence. However, in some EU regions, particularly the Baltic States, South-East Europe and the Iberian Peninsula, additional gas infrastructure is still needed in order to improve the gas supply security. Initiatives are currently being taken, e.g. under the framework of the 10-year Investment Plan of ENTSO-G and a number of projects designed to address these issues will be commissioned in the coming years.

WORKSHOP PROCEEDINGS

Opening Remarks

Jerzy Buzek, ITRE Chair

The workshop was chaired by Mr Jerzy Buzek. His introduction mentioned the crucial importance of security of energy supply for the EU economy. An issue of particular importance in this area is the high, and increasing, gas import dependence of the EU (53.5% in 2014 versus 45.5% in 1990) and the reliance of several EU Member States on one main gas supplier. Diversification of sources and routes is a key factor in improving Europe's security of energy supply. This workshop focuses on the security of gas supply in the medium and long term.

PART 1: EU Energy independence, security of supply and the role of gas

Natural Gas Security of Supply in the EU

Peter Fraser, Head of Gas, Coal and Power Markets Division at the IEA

Mr Fraser began by highlighting the three main messages of his presentation: the EU-28 has a high energy import dependence and an increasing gas import dependence - the flexibility potential in the electricity generation system to switch from gas to other fuels is decreasing – the EU gas demand and import dependency can be lowered by energy efficiency measures.

He stated that the EU-28 gas demand stabilised in 2015-2016, helped by gas prices decreasing to their lowest level since 2005. A modest recovery of EU gas demand is expected in 2017-2021, partly because of coal and nuclear plant retirements. However, gas consumption will increase in China, the Middle-East, India and the US. In the medium term, EU natural gas demand is likely to change little. As domestic EU gas production is declining (down by 41% over the past 10 years) and as the decline is expected to continue, gas imports will further increase. To date, those increased imports have been met by Russian pipeline gas. Russia accounted for 44 % of EU imports in 2015 and reinforced its dominant supplier position in 2016. LNG imports accounted for 13% of EU consumption in 2015, but the EU has the ability to import a lot more LNG. The utilisation rate of existing EU regasification infrastructure is rather low (23% in 2016), and with new investment in LNG liquefaction capacity (mainly in the US, Australia and Qatar) coming online in the next few years, there will be a lot of LNG available. This is leading to increased destination flexibility and shorter terms in LNG contracts, which is helping to attract new customers and makes LNG a more flexible alternative than it has been historically. A higher utilisation rate, further investment in EU regasification terminals and associated investment in supporting infrastructure, and the access to multiple international source countries can mitigate the risk of gas import dependence.

Another positive factor is the increased emphasis put upon robust regional gas markets in recent EU legislation. Implementation of such legislation should strengthen these markets and ensure gas needs can be met efficiently.

In terms of fuel substitution, current forward prices for natural gas, coal and carbon suggest there will be little fuel switching to gas fired power generation in the short term. Retirements of coal, oil and nuclear capacity will, however, reduce this flexibility in the future.

The one issue which gives some cause for concern is what is happening to natural gas storage. Storage is another source of gas system flexibility and security of supply. Storage operators are facing difficult economic circumstances due to low price spreads between summer and winter which may lead to further storage decommissioning in the coming years.

The future context for natural gas supply security will partly depend on the level of demand. Looking ahead, the IEA's World Energy Outlook predicts that gas demand in the EU will remain more or less flat in the "New Policies" scenario. However, in the more ambitious "450" emissions reduction scenario, EU gas demand will start to fall after 2025, thanks to higher end use efficiency and decarbonisation of the electricity supply. Lower gas demand would lead to less dependence on imports.

Reducing energy supply security risks by diversified gas sourcing and adequate investments in pipelines and LNG terminals

Katja Yafimava, Senior Research Fellow at The Oxford Institute for Energy Studies (OIES)

Mrs Yafimava focused on long-term supply and infrastructure issues impacting European gas security. She assessed potential sources of additional gas supplies for Europe post-2020 and their likelihood, and necessary infrastructure (pipelines/LNG terminals) for bringing this gas to Europe.

She began by focusing on domestic European (EU/EEA) gas production: conventional production (mainly in Norway, the Netherlands and the UK) will decline by 87 to 120 Bcm by 2030. Unconventional gas production is expected to remain well below 20 Bcm by 2035 and will therefore not compensate for the decline in conventional production. She then identified the gas sources that could close that gap: pipeline gas supplies from the Southern Corridor (Azerbaijan, Turkmenistan, Iraqi Kurdistan, Iran) represent a major element of EU supply diversification (both in terms of route and source). Security of supply policy since the late 1990s has ensured that they enjoy favourable regulatory treatment and political support, but their export potential to the EU is limited. The supply potential of Algeria and the Eastern Mediterranean Region is, partly as a result of the export infrastructure, also very limited. The only significant sources able to increase production and export to the EU in a 5 to 10 year time frame are global LNG and Russian gas. The potential availability of global LNG for Europe, and underlying infrastructure was then shortly presented as well as the contractual commitments in respect of Russian gas exports to Europe.

Mrs Yafimava concluded that global LNG and Russian pipeline gas will remain the two main sources to meet EU demand up to 2030. No significant non-Russian pipeline gas will be available for the EU before 2025, and Russian gas will be competitive with other sources in a hub-priced EU market. Abundant LNG regasification capacity is available in most EU regions (current overall capacity in EU = 210 Bcm), and its utilisation rate is low. The availability of LNG capacity is however still limited, but expanding (with EU financial support), in Central and South Eastern Europe, as well as in the Baltic States, which leads to a high dependence of these countries on Russian gas. This is problematic, from both a commercial and geopolitical perspective. The ongoing investments, including in interconnections, will reduce the gas supply vulnerability of these regions.

Mrs Yafimava concluded by stating that the main risks to existing commercial relationships with gas suppliers are political, legal/regulatory and contractual; and that these risks should be mitigated. She further concluded that Europe's gas supply is overall well diversified, with the threat of supply and price disruptions up to 2030 from any source being at an acceptable level, but Central and Southern Eastern Europe and the Baltics should reduce their overdependence/vulnerability by 2020 through additional infrastructure enabling their access to alternative sources.

Contribution of gas infrastructure to enhance security of supply

Jan Ingwersen, General Manager, ENTSO-G

Mr. Ingwersen began by giving a short update on the status of the network codes and the stakeholder involvement in the elaboration of the 10-Year Network Development Plans (TYNDP), which has become a highly inclusive and transparent process. The transparency platform has significantly improved – and will continue to improve - market integration and functioning. Market integration together with infrastructure developments have also improved the security of gas supply.

He then referred to the TYNDP 2017, which was published in December 2016. The demand scenarios used in the TYNDP 2017 are aligned with the EU energy and climate priorities and are coordinated with ENTSO-E. These scenarios are not forecasts or visions – they represent potential future gas demand, based on country specific input provided by national experts, and serve as the basis for testing the resilience of the gas infrastructure in the various EU regions under peak demand conditions. He highlighted the fact that gas infrastructure must be designed to cope with peak demand, which is still increasing in the EU, notwithstanding the stabilisation or slight decrease in gas demand. The overall gas demand is, however, still substantially higher than the electricity demand.

Mr. Ingwersen identified the EU Member States that do not meet the N-1 infrastructure criterion (the ability to meet demand if the largest piece of national supply infrastructure is not available) and may face demand curtailment. Ongoing projects will partly mitigate this critical situation by 2020, but further mitigation requires projects from the second PCI list to be put in place. The existing infrastructure already offers resilience to extreme temperatures and to disruption of Algerian, Libyan and Norwegian supply sources, but further investments are required to mitigate the impact of disruptions in the Belarus and Ukrainian routes on gas supply to EU member states and to mitigate N-1 risks in specific countries.

The infrastructure investments allow most EU Member States to have access to diverse supply sources and have resulted in highly interconnected markets and converging wholesale prices, especially in Western Europe. Additional gas infrastructure is however still needed in some specific regions, particularly the Baltic States, South-East Europe and the Iberian Peninsula, in order to improve the gas supply security and competition in these regions.

Several projects that contribute to improving security of supply are expected to be commissioned in the coming years, and further potential projects are included in the TYNDP 2017, particularly in BEMIP (Baltic region), the Southern Gas Corridor and the North-South Interconnection West and East.

Mr. Ingwersen concluded that EU gas infrastructure is in general well developed, and assessing the need for further investments requires energy scenarios covering a range of possible futures. The security of supply situation is not the same all over Europe; additional gas infrastructure is still needed in specific regions to allow a more diverse and competitive supply.

Questions & answers

Mr Buzek, ITRE Chair thanked the speakers and opened the floor for questions.

Mr Turmes, MEP, referred to the presentation of Mr Ingwersen and stressed the remarkable progress which has been realised in the last 10 years. Thanks to several political initiatives and co-funding at EU level of investments in pipelines (including reverse flows) and LNG terminals, the EU has reached a high level of gas supply security, except in some Member States, e.g. Romania, although this country chooses to use its own fossil fuel reserves. He then raised some questions, as follows; he asked for clarification with regard to the scenarios

used in the TYNDP 2017 of ENTSO-G (impact on gas consumption and peak demand of the renovation of the building stock and the use of open versus combined cycles for power generation), the gas import dependency of the Baltic States taken into account their realisation of EU co-funded investments in a LNG terminal and storage, and the potential role of energy efficiency and biogas to enhance security of supply.

Mrs Miapetra Kumpula-Natri, MEP, suggested that the assessment of the security of supply situation and evolution should not only focus on the short term, but should also consider the medium and long term. She then referred to the specific situation of Finland (which does not yet comply with the N-1 security of supply standard), where gas is mainly used in industry and to a limited extent in the building sector. Diversification of both routes and sources is necessary, and products from forests can play a role in substituting gas if necessary.

Mr Sylikiotis, MEP, noted that the information provided with regard to the current situation and perspectives is important and that the EU has to plan the next steps. The need for gas imports is high and alternatives should be assessed. In this context, he asked to what extent the gas reserves in the East Mediterranean region could play a role in supplying the EU.

Mr Buzek, asked for concrete indications with regard to the most important bottlenecks in both EU gas infrastructure and gas market function. This information might constitute useful input for the upcoming legislative package.

Mr Fraser commented on the impact of gas fired power generation (open versus combined cycle) on gas demand. The investment cost per MW for open cycle technology is lower but its gas consumption is higher (lower efficiency). With regard to the question on infrastructure bottlenecks, he referred to storage for which he suggested that a level playing field should be established at EU level.

Mrs Yafimava agreed that biogas is a domestic source with some potential (up to 50 Bcm by 2030) to contribute to supply security but it will not be sufficient to compensate for the decline in domestic gas production. In addition to this its use is subject to regulation and (and least temporarily) it requires financial support. She confirmed that gas infrastructure investments have been realised in the Baltic States to reduce their supply vulnerability, but nevertheless they continue to largely rely on Russian gas imports, mainly for price reasons. The Baltic States now have access to alternative sources, but they would need to pay a risk premium to have a more effectively diversified supply. The reserves in the Eastern Mediterranean Region are taken into account in the OIES estimates, but, as transporting this gas to the EU might be difficult, they are mainly expected to have a regional role. Mrs Yafimava finally referred to the general context and confirmed that the security of supply has significantly improved thanks to the implementation of the 3rd package and the improvement of gas market function.

Mr Ingwersen agreed on the positive impact of the 3rd package and security of gas supply Regulation on the EU gas supply, and confirmed that the impact on gas demand of energy efficiency efforts and shifts in power generation are duly taken into account in the scenarios which are at the basis of the investment plans of ENTSO-G. He also recalled that an increased use of existing CCGT capacity offers both economic and environmental benefits; in this context he suggested that any remuneration scheme for the power sector should be coupled with GHG emission standards. He added that ENTSO-G is working on valuing the potential of biogas, and recalled that critical infrastructure is still missing in a few EU regions.

PART 2: Energy security and diversification of sources

The regulators' view on Europe's energy dependence and the role of LNG to improve security of supply

Tomislav Jureković, CEER Vice President, Hrvatska energetska regulatorna agencija/ Croatian Energy Regulatory Agency (HERA)

Mr Jurekovic began by describing how energy dependence is mainly impacted by the diversity/diversification of energy sources and by market function. He then identified the major EU legislative measures which focus on reducing energy dependence and enhancing security of supply, and commented in particular on the analyses and policy recommendations of CEER on the EU's specific security of supply aspects. Consistent policies of source diversification paired with continuing efforts to operationally complete the EU internal energy market in order to fully grasp the advantages of a competitive EU energy market (attractive for international energy trade) appear to be the best bet for providing reasonable levels of security of supply.

While recognising the differences between specific positions of individual member states, general recommendations of EU regulators focus on supporting continuing efforts to operationally complete the internal energy market. This should provide the basis for primary reliance on market measures in securing security of supply. The importance of regional planning (with a flexible definition of regions) was recognised, as was the ongoing discussions into the frame for solidarity as the basic support mechanism. This purist' reliance on market mechanisms for providing security of supply, although preferred by the majority of regulators, nevertheless raises concerns regarding the affordability of gas under the conditions of shortage or crisis induced price spikes.

Liquefied natural gas has established itself during the past decades as an important part of the European gas supply scene. Both as the primary source of gas and as a provider of additional supply flexibility. With well developed (although unequally distributed across the EU) regasification infrastructure, the potential of LNG as a possible pillar of the EU security of gas supply has in recent years come under close consideration. Recent technological developments and new LNG-related services hold the promise of further realising this potential.

EU regulators have long recognised the importance of LNG for the European gas market and for many years they have made efforts to monitor and improve the regulatory framework and market transparency of LNG business in Europe. Their recent work on the relation between LNG and security of gas supply has resulted in practical recommendations for additional improvements.

However, the uncertainties regarding the future role of gas, underlined by the background of decreasing gas demand give rise to regulatory concerns. In relation to LNG-related developments striving to fill the infrastructure gaps, both in regasification and in connecting pipelines, these concerns are primarily centred around the efficiency of future infrastructure and the danger of stranded assets – potentially launching a vicious circle of rising infrastructure costs and decreasing competitiveness of gas.

The recent CEER analysis on the value of LNG for security of supply concluded that LNG is a key source of gas supply diversification, but further measures could be taken (e.g. more market information and transparency) to improve the functioning of the LNG market and to enhance its contribution to security of supply. New LNG infrastructure will be primarily driven by the market, but security of supply objectives should also be considered, preferably at regional level. In this context, he referred to the Croatian LNG terminal project, which contributes to the security of supply of the concerned region and has received EU support as

a Project of Common Interest. Mr Jurekovic finally pointed to some challenges (e.g. geopolitical evolutions, development of LNG-infrastructure) and uncertainties (e.g. gas demand evolution), which might affect the security of supply and affordability of gas in the EU.

EU Gas Market Fundamentals - Prospects for a Sustainable Diversification of EU Gas Supplies

Coby van der Linde, Director of the Clingendael International Energy Programme

Mrs van der Linde began by commenting on the EU gas demand outlook to 2025, which is characterised by a high uncertainty linked to policy directions in the power sector. Due to declining domestic gas production, gas import needs rise in all scenarios, but gas demand uncertainty hampers any drive to secure new long term supplies.

Potential imports into the EU from new pipeline suppliers (Azerbaijan, East Mediterranean, Iraqi Kurdistan, Turkmenistan and Iran) are limited for different reasons, in particular the capital intensive transport infrastructure needed to reach the EU market and the limited appetite in the EU to enter into new long-term contracts. Moreover, geopolitical hurdles further complicate new projects. Additional pipeline gas volumes cannot be imported from current suppliers in Norway, Algeria or Libya. Only Russia has spare production capacity for additional supplies; its prices are competitive but the transport is a potential bottleneck.

Additional gas imports can also be sourced on the global LNG market, e.g. from Australia or the US where additional export capacity is becoming available. The LNG market is expected to remain in surplus until 2023-2025; final investment decisions are however needed in the next years to avoid a tight market in 2025. Additional flexible LNG can be imported into the EU where considerable spare terminal capacity is currently available.

Mrs van der Linde then commented on the different definitions of security of supply (operational, strategic, geopolitical and long-term) and the respective solutions to ensuring it. She concluded that demand and supply developments in world gas markets are relevant for the EU due to the expectation of increased demand for imported gas. In the current market, world supply is ample and the EU, with its pipeline connection to suppliers (Norway, Algeria and Russia) and LNG terminal capacity, has sufficient options to import from various sources. The EU is currently enjoying a buyers' market, with a significant surplus of both pipeline gas and LNG, and a high level of price competition and supply security. The market share of any supplier is currently irrelevant and minimising obstacles to competition will enhance a competitive and security environment. Mrs van der Linde warned however that this favourable supply situation may possibly change if the world gas market becomes tighter in the post-2020 period. The appetite to contract for security of supply is low. This is in part due to changing market structures and developments in the EU and also due to evolving market structures in the world gas markets. In a tighter world gas market, international gas relations may gain renewed prominence. If Asian and/or LNG business models shift to mainly short term transactions, LNG supply to the EU might in a tight market depend on EU gas price levels. In this context, the EU authorities and market parties should remain vigilant in order to properly anticipate possible future international market developments, in particular in Asia.

Questions & answers

Mr Buzek raised a question regarding some concrete figures in the presentation of Mrs van der Linde on the LNG import terminal in Poland and asked the opinion of Mr Jurekovic on gas price regulation.

Mrs van der Linde agreed that the figures of the LNG terminal in Poland were indeed missing in the slide.

Mr Jurekovic confirmed that all EU energy regulators are generally in favour of eliminating regulated prices, as price regulation is not in line with market principles and can cause distortions. He added that the absence of price regulation might however have an impact on the affordability of gas, particularly if price spikes occur.

Closing Remarks

Mr Buzek thanked the speakers for their interesting input.

ANNEX 1 AGENDA

Workshop on

EU Energy Independence, Security of Supply and Diversification of Sources

**Organised by: Policy Department A: Economic and Scientific Policy
for the Committee on Industry, Research and Energy (ITRE)
European Parliament, Brussels
6 February 2017, 15:00 to 16.30
Room: JAN2Q2**

15:00 - 15:05 Introduction by Jerzy Buzek, ITRE Chair

PART 1: EU Energy independence, security of supply and the role of gas

- 15.05 – 15.15 Natural Gas Security of Supply in the EU
Peter Fraser, *Head of Gas, Coal and Power Markets Division at the IEA*
- 15.15 – 15.25 Reducing energy supply security risks by diversified gas sourcing and
adequate investments in pipelines and LNG terminals
Katja Yafimava, *Senior Research Fellow at The Oxford Institute for Energy
Studies*
- 15.25 – 15.35 Contribution of gas infrastructure to enhance security of supply
Jan Ingwersen, *General Manager, ENTSO G*
- 15:35 - 15:55 Q&A

PART 2: Energy security and diversification of sources

- 15:55 – 16:05 The regulators' view on Europe's energy dependence and the role of LNG
to improve security of supply
Tomislav Jureković, *CEER Vice President, Hrvatska energetska regulatorna
agencija/ Croatian Energy Regulatory Agency (HERA)*
- 16:05-16:15 EU Gas Market Fundamentals - Prospects for a Sustainable Diversification
of EU Gas Supplies
Coby van der Linde, *Director of the Clingendael International Energy
Programme*
- 16:15 -16:30 Q&A

ANNEX 2 SHORT BIOGRAPHIES OF THE EXPERTS

Peter Fraser (IEA - Head of the Gas, Coal and Power Markets Division)

Peter Fraser rejoined the International Energy Agency in December 2016 as Head of the Gas, Coal and Power Markets Division. This is his second sojourn with the IEA, having been Senior Electricity Policy Advisor at the IEA from 1998 to 2004. In between, he worked at the Ontario Energy Board, the energy regulator in the Canadian province of Ontario, most recently as Vice President, Consumer Protection and Industry Performance. From 1989 to 1998, he was energy policy advisor at the Ontario Ministry of Energy. Peter holds master's degrees in physics from Queen's University and in environmental studies from York University and a BSc in physics from the University of Toronto.

Katja Yafimava (Oxford Institute for Energy Studies, Natural Gas Research Programme - Senior research fellow)

Dr. Katja Yafimava is Senior Research Fellow on the Oxford Institute for Energy Studies Natural Gas Research Programme. She holds a D. Phil. in Geography and a M.Phil. in Russian and East European Studies from Oxford University. She is the author of *The Transit Dimension of EU Energy Security: Russian Gas Transit Across Ukraine, Belarus, and Moldova* (OUP 2011). She is also the author and co-author of chapters in other OUP books, such as *The Russian Gas Matrix: how markets are driving change* (2014), *The Pricing of Internationally Traded Gas* (2012), *Russian and CIS Gas Markets and their Impact on Europe* (2009) (all OUP) and in the *Research Handbook on International Energy Law* (Edward Elgar, 2014) as well as many research papers on gas transit disputes. Her current research focus is gas regulation, both in Europe and Russia, with publications including 'The EU Third Package for Gas and the Gas Target Model: major contentious issues inside and outside the EU' (2013), 'The Evolution of Gas Pipeline Regulation in Russia – third party access, capacity allocation and transportation tariffs' (2015), 'Russian Gas Transit across Ukraine Post-2019: pipeline scenarios, gas flow consequences, and regulatory constraints' (2016) and, most recently, 'The OPAL Exemption Decision: past, present, and future' (2017).

Jan Ingwersen (ENTSO-G - General Manager)

Jan Ingwersen was designated by the ENTSO-G General Assembly as General Manager for the term 1st January 2016 – 31st December 2018. He has been with ENTSO-G since January 2014 in the position of Business Area Manager for Market, and is seconded from Energinet.dk in Denmark.

Mr. Ingwersen has been working in the gas industry for more than 25 years, holding positions at Energinet.dk, Gastra, DONG Energy as well as consultancies. He holds a technical MSc from the University of Aalborg, Denmark, supplemented with a commercial degree from the Copenhagen Business School and a management education from IMD, Lausanne.

Mr. Ingwersen has been involved in most parts of the gas sector value chain. He headed the implementation of the gas market liberalisation in Denmark for Energinet.dk/Gastra (2000-2005), including the development of network codes. He was head of DONG Energy's storage and offshore transmission activities (2006-2013), established the company's gas regulatory affairs department and was in the same period responsible for a 6-year 'two-way gas release programme'.

Tomislav Jurekovic (Head HERA / Head of CEER's SoS WG)

Tomislav Jureković was born in 1959 in Zagreb. He graduated with a degree in energy and power engineering from the Faculty of Mechanical Engineering of Zagreb University, where he also attended graduate studies.

Mr. Jureković spent most of his professional career in various tiers of natural gas business – from gas distribution to supply. As a Business development manager of Zagreb Gas Distribution Co. (GPZ) he became involved with the international gas and energy scene. Fluent in English and German, during the 1990s he represented Croatia in the International Gas Union and UNECE Working Party on Gas.

After brief spells in consulting activities he joined Croatian-German JV holding co. Croplin Ltd., during which time he was actively cooperating with Croatian energy authorities on energy sector reform topics and in drafting early versions of national gas legislation.

Mr. Jureković joined the Croatian Energy Regulatory Agency (HERA) in 2011, when he was appointed by the Croatian Parliament as Commissioner. Since July 2012, he has served as the President of the Board of Commissioners, with his second and full term as the President confirmed by the Parliament in July 2014. In this position, he also represents the Croatian energy regulatory body in the CEER General Assembly, ACER Board of Regulators and the Energy Community Regulatory Board. In May 2015, Mr. Jureković was re-elected by the General Assembly of CEER to the position of CEER Vice President.

As an avid and outspoken gas and energy industry watcher, Mr. Jureković has published extensively and spoken on numerous occasions in front of domestic and international audiences.

Coby van der Linde (Director Clingendael International Energy Programme)

Coby van der Linde has been director of the Clingendael International Energy Programme (CIEP) since 2001. This followed a position as senior research fellow at the Netherlands Institute of International Relations Clingendael since 1998. She was also (part-time) professor of Geopolitics and Energy Management at the University of Groningen since 2004, and is a non-executive director of three energy companies and a member of the International Advisory board of KAPSARC, Saudi Arabia.

Previously, she worked at the University of Leiden (Assistant Professor International Economic Relations; 1991, Associate Professor International Economic Relations; 1995-1998 Jean Monnet Professor of European Economic Integration; 2000-2005, (part-time) Professor International Political Economy and International Oil Markets). She was also Guest Researcher at the Oxford Institute for Energy Studies; the Energy and Environment Programme, the Royal Institute for International Affairs 'Chatham House', London; Visiting Domingo Moreno Professor, Colorado School of Mines, Golden Colorado, USA; (part-time) Professor International Oil Markets at the University of Amsterdam.

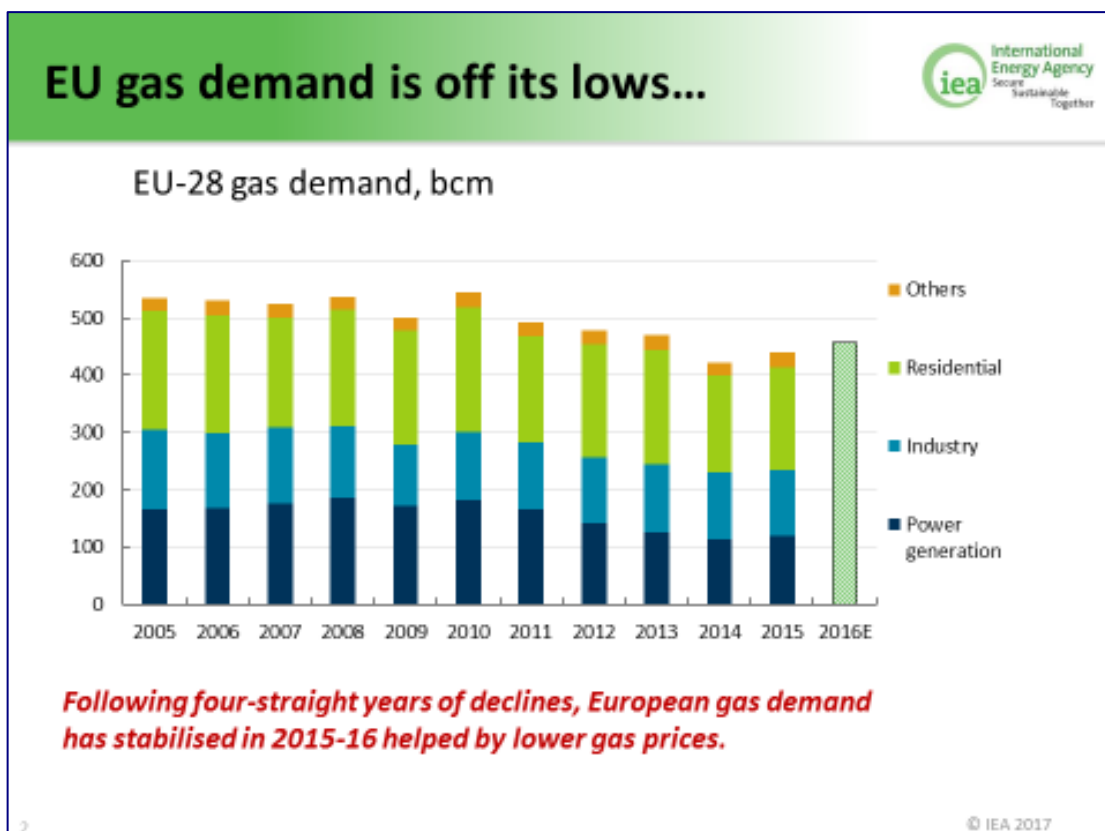
ANNEX 3 PRESENTATIONS

Presentation by Mr Peter Fraser

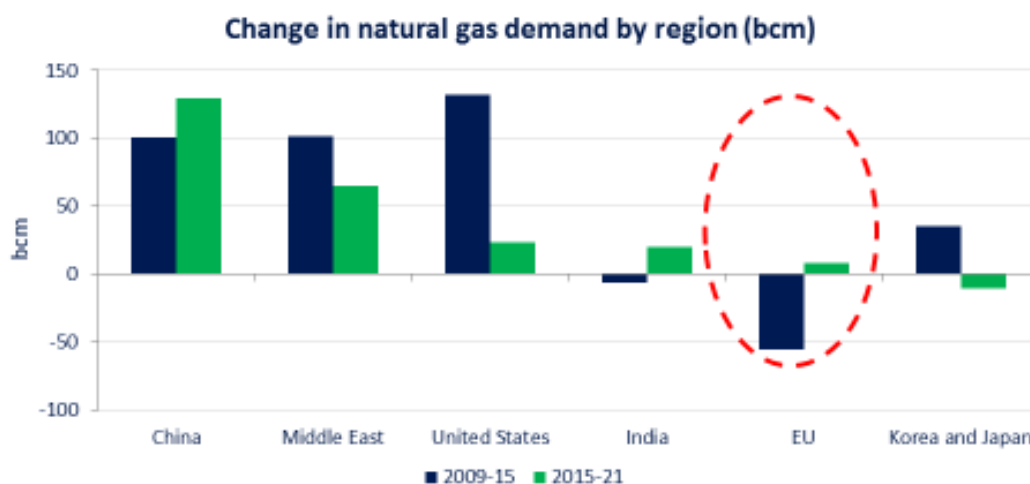


Natural Gas Security of Supply in the EU

Peter Fraser



...But only a modest recovery is expected

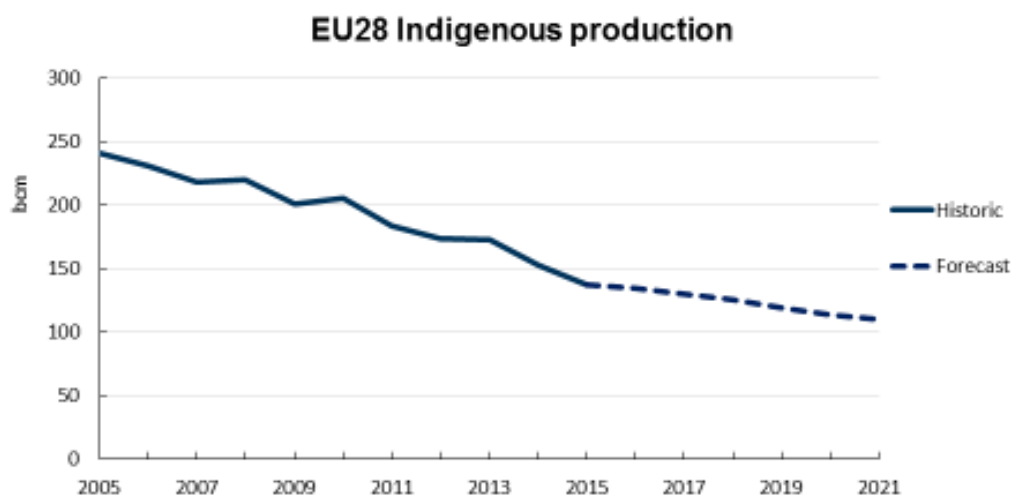


EU gas demand gradually recovers on coal & nuclear power plant retirements but remain 13% below the 2007 level by 2021.

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Domestic production is declining



Europe gas production has fallen by 41% over the past 10 years. The drop is expected to continue, amid low investments and caps on Dutch production

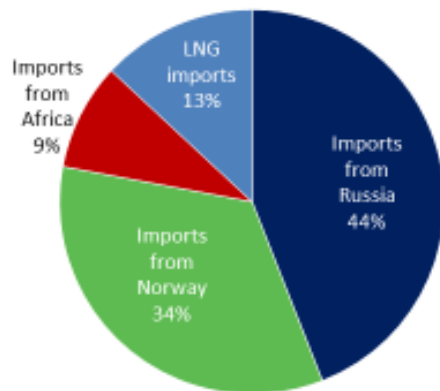
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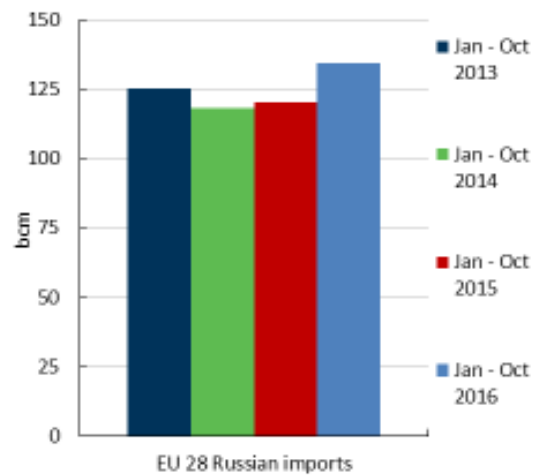
Russian gas imports are near an all time high



EU 28 gas imports in 2015



EU 28 Russian imports



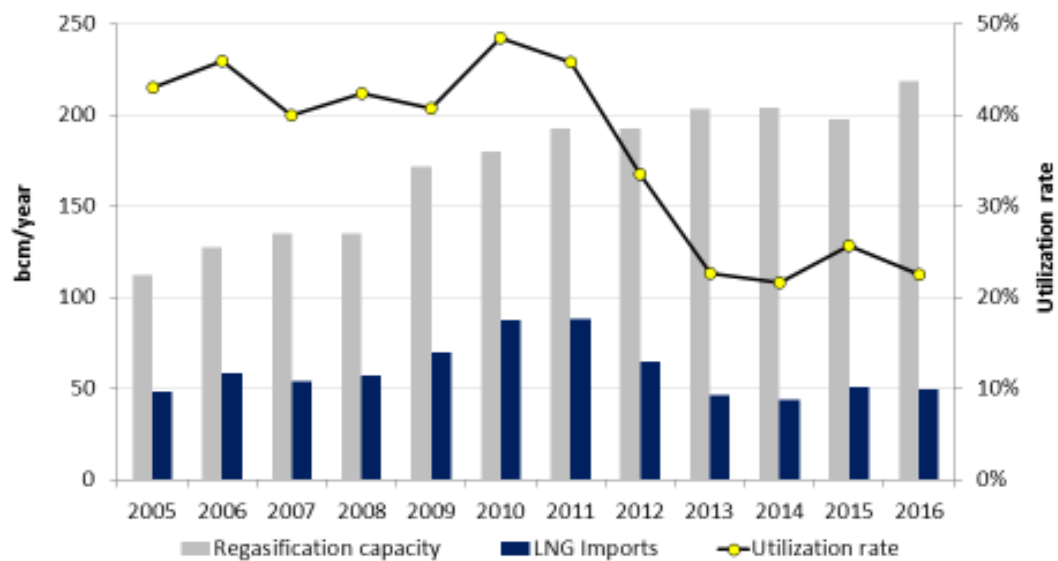
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....And Europe has ample spare regasification capacity



LNG regasification capacity, imports and utilization rate in OECD Europe



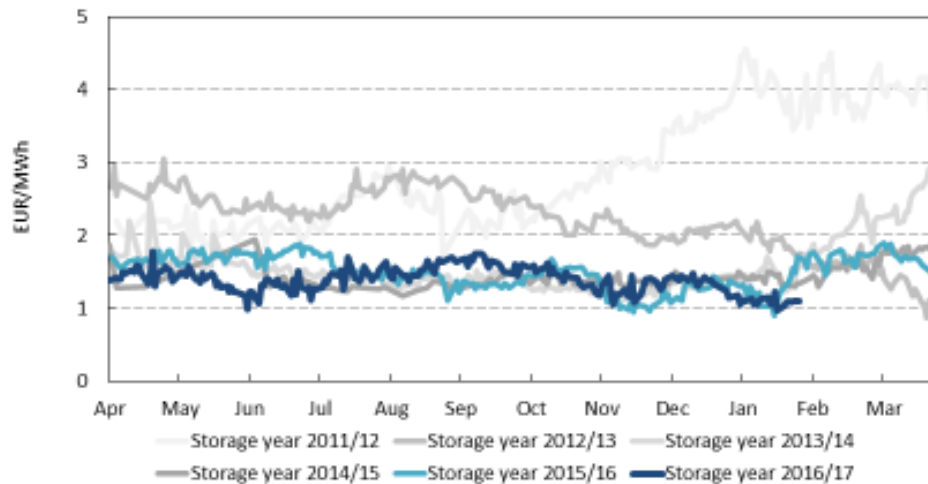
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© IEA 2017

But difficult economic environment for European storage operators



TTF summer-winter spreads



the market may face further storage decommissioning in the next years

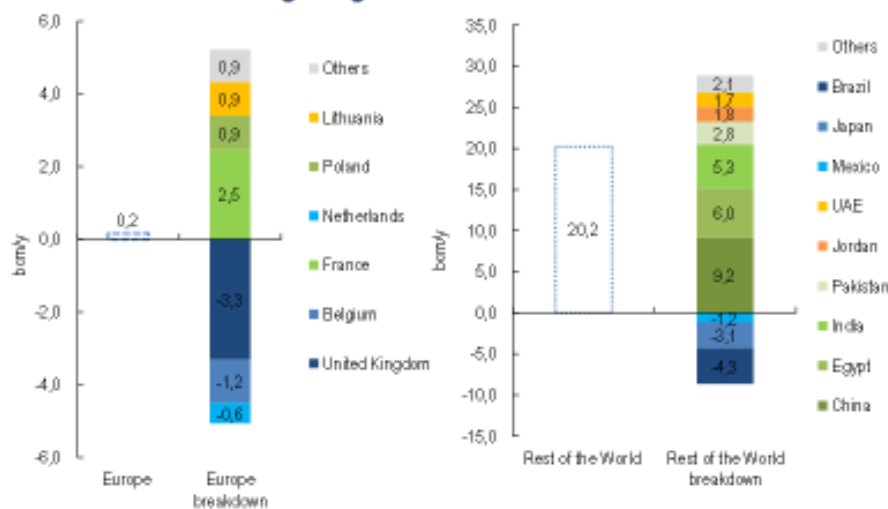
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....And LNG is heading somewhere else



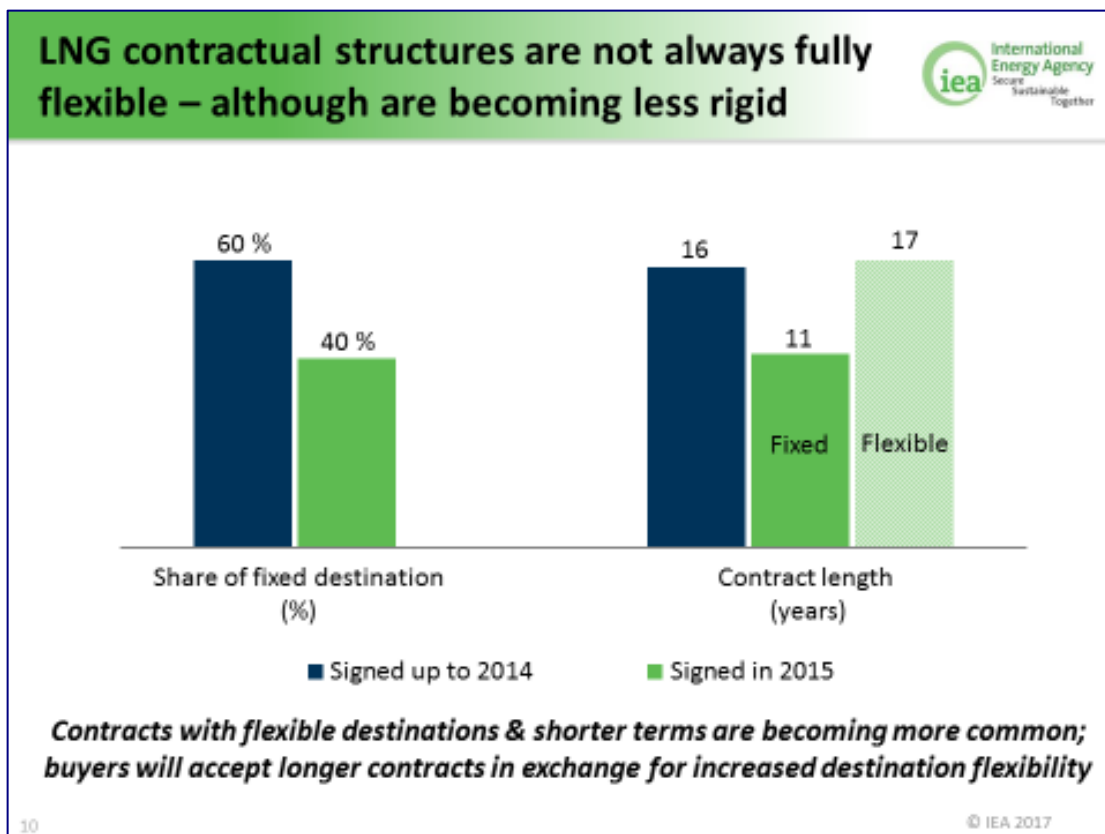
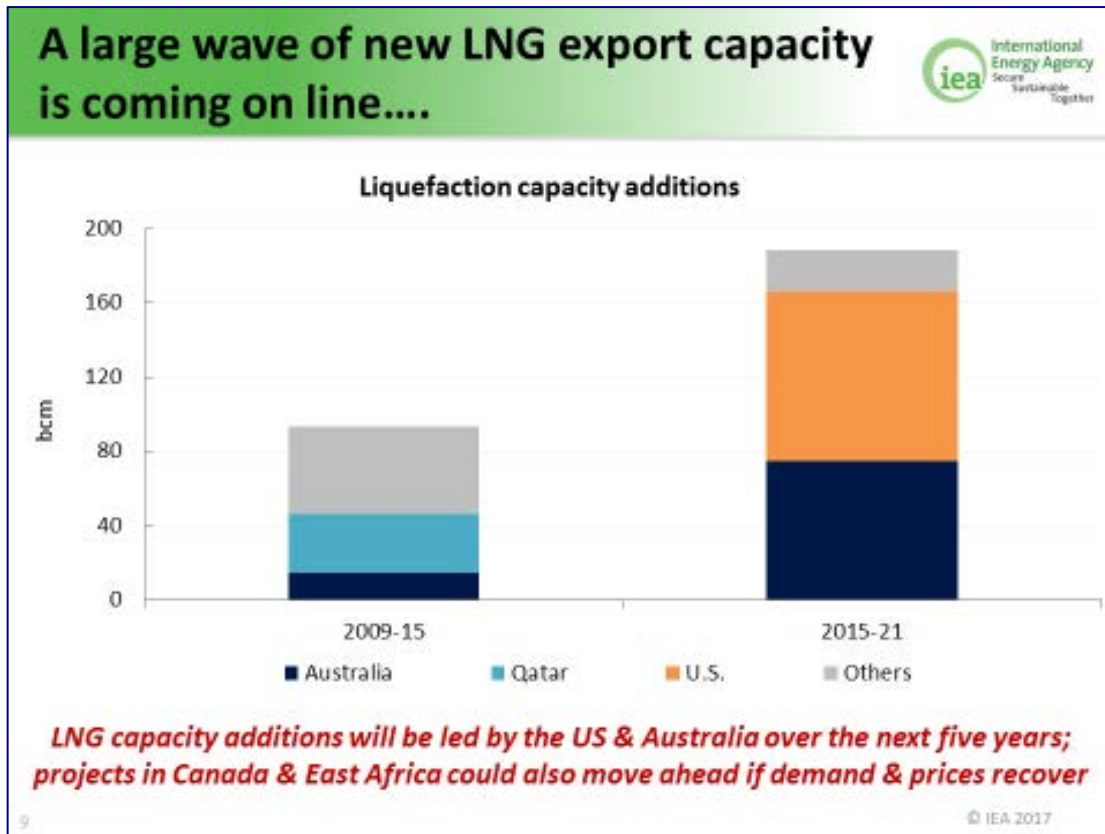
Change in global LNG trade 2016 vs. 2015



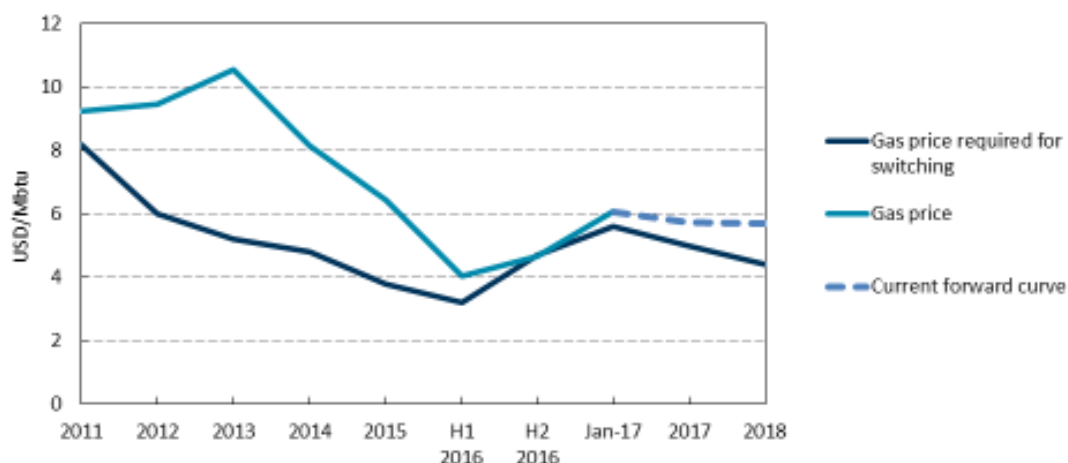
China + India account for half of the incremental LNG trade while the remaining half comes from MENA countries + Pakistan

8

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And changing incentives for coal to gas switching



40% coal plant efficiency, 55% gas plant efficiency, forward curves of mid January

Power sector could be a source of gas demand growth, but not at expected coal or carbon prices.

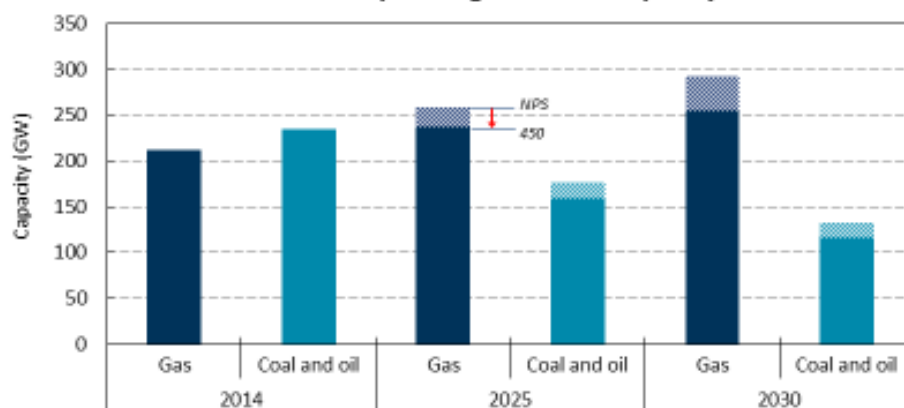
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On the other hand, Europe's gas demand response possibilities will change over time



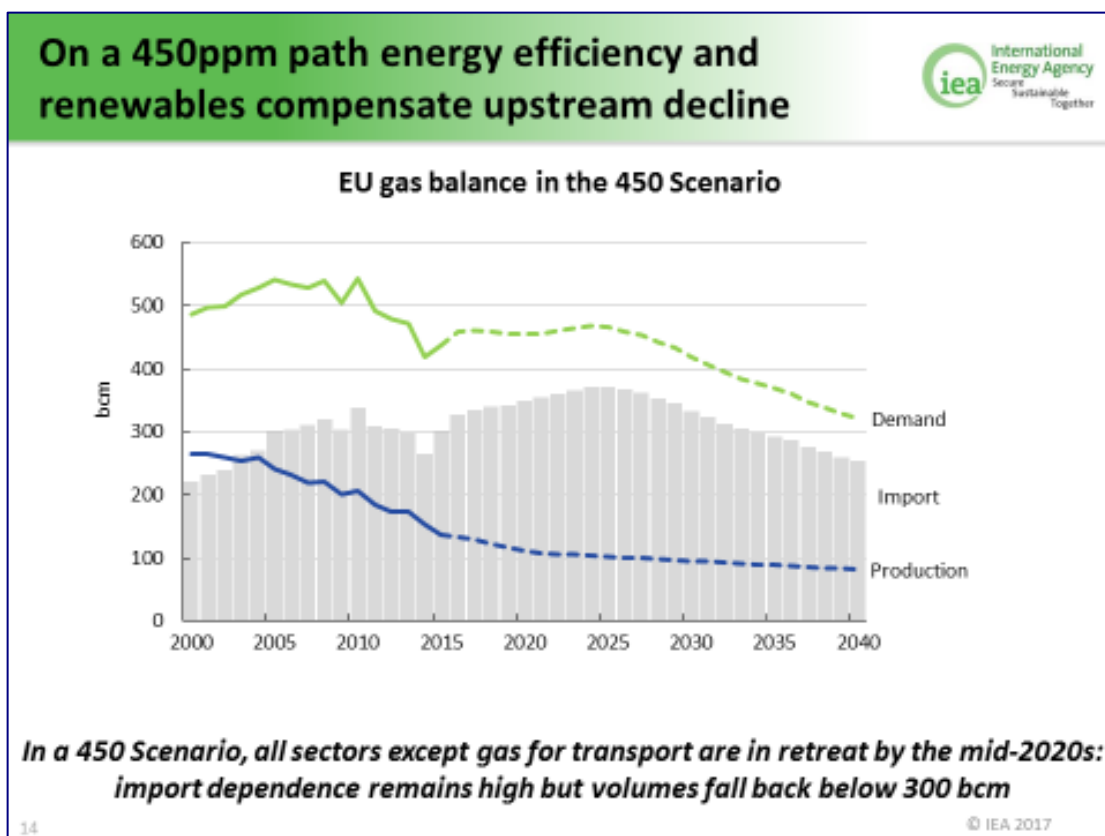
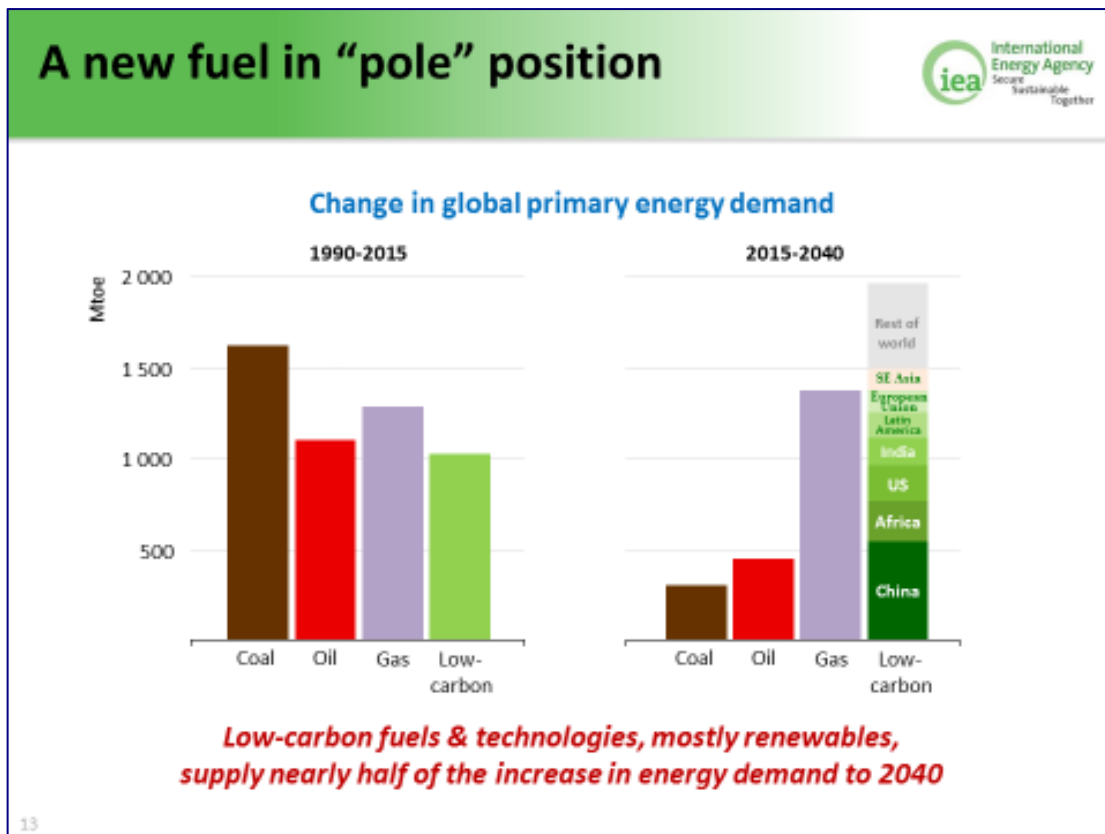
EU power generation capacity



On the other side of the spectrum: switching away from gas to coal in Europe has proven a useful market response mechanism during the Fukushima crisis, future coal capacity retirements however will limit this potential

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Presentation by Dr Katja Yafimava



Reducing energy supply security risks by diversified gas sourcing and adequate investments in pipelines & LNG terminals

Dr Katja Yafimava

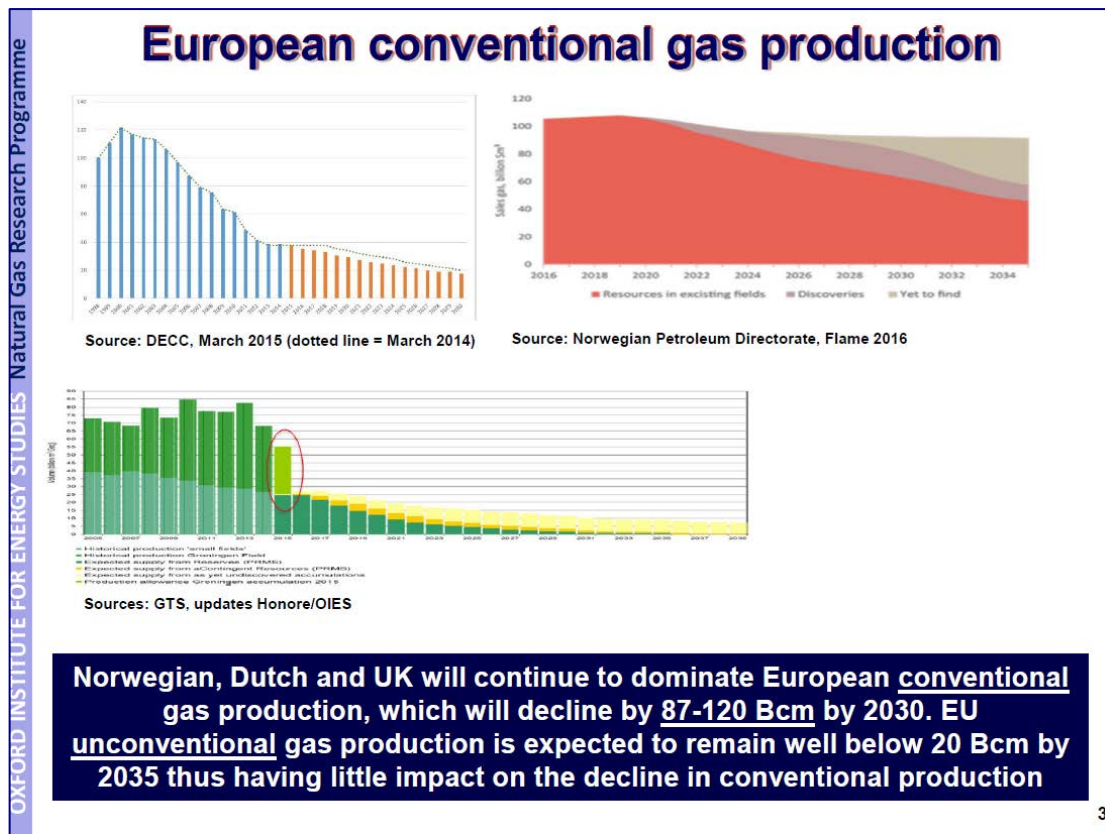
Senior Research Fellow, OIES Gas Programme

ITRE Workshop “EU energy independence, security of supply and
diversification of sources”, European Parliament,
Brussels, 6 February 2017

European gas security: long term supply and infrastructure questions

- **European gas security:** **acceptable level of threat of supply and price disruptions in any part of gas chain (sources transport/transit infrastructure, facilities)**
 - **Longer term supply:** from where is Europe likely to receive additional gas post-2020?
 - **Infrastructure:** which new pipelines and LNG terminals are likely to be built and how will they impact on European gas security?
- **Risks:** **governmental** (political relationships between suppliers, buyers & transit countries); **contractual** (renegotiation /arbitration/cancellation); **legal/regulatory** (e.g. EU/EnCT 3rd Package); **facility** (e.g. underinvestment, sabotage)

Perceptions of longer term gas availability, and security implications of new infrastructure, differ across Europe and impact EU policy making. Perceptions of threat as well as acceptable levels of threat also differ.



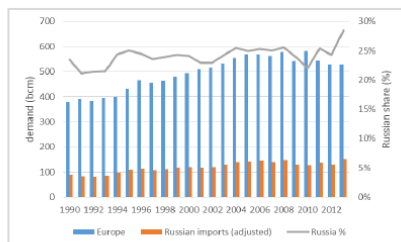
Non-EU/non-EEA non-Russian pipeline supplies: north Africa and eastern Mediterranean

- **Algeria:** no increase in exports likely by 2020; outlook for 2030 is unpromising:
 - rapidly growing domestic demand & stagnating gas production mean exports will decline to 15 bcma by 2030, and in low production/high demand scenarios, will cease altogether.
 - unless production can increase faster than domestic demand there is no possibility of turning this around despite ample reserves BUT exports have increased in 2016
- **East Mediterranean:** 10 Bcm exports of Israeli gas as LNG via Egypt questionable since the Zohr discovery, and pipeline gas exports to regional countries (but not Turkey) are likely if politics permit

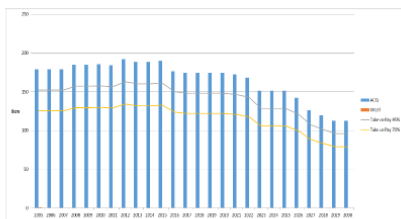
The only significant sources able to increase production in a 5-10 year time frame is global LNG and Russian gas

5

Russian gas to Europe: varying degrees of dependence



Source: OIES 2014 based on 40 European countries



Source: ERI RAS in OIES 2014

- Europe overall depends on Russian gas for some 25-28% of demand – a healthy share from a commercial point of view
 - Even at 70% ToP, Gazprom's average annual sales exceed 100 Bcm/year until the mid-2020s
- NW & SW European countries (more than ¾ of Russian gas exports to Europe): relatively low levels of supply concentration, (mostly) meet N1 standard
- But CE, SE, Baltic countries, which account for less than ¼, remain highly dependent and vulnerable:
 - N-1 standard not met (2013): **Bulgaria, Greece, Lithuania, Estonia, Slovenia**
 - SCI>30 (2012): **Austria, Bulgaria, Czech Republic, Estonia, Finland, Greece, Hungary, Lithuania, Latvia, Poland, Slovakia**. Non-EU, SCI > 30 (2013): **Serbia, Bosnia & Herzegovina, FYROM, Turkey**

Europe overall is well diversified but the Baltic region, Central Europe, South East Europe are highly dependent on gas from one source – Russia, this is problematic, irrespectively of whether viewed from commercial or geopolitical point of view, hence more attention needed to these regions

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The Nord Stream & Turkish Stream/ "southern route" pipelines



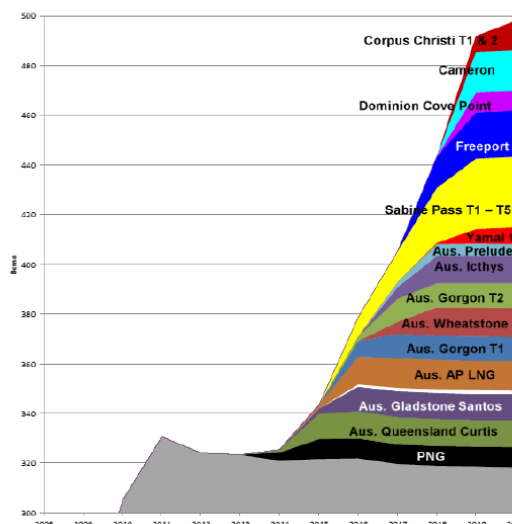
Source: OIES



Source: OIES

Nord Stream: 55 bcm (in two strings): operational since 2011-12.
Nord Stream 2: 55 bcm (in two strings): under development but faces formidable political & regulatory obstacles making 2020 start unlikely.
Turkish Stream: revived in August 2016, with strong likelihood that at least one string will be built by 2020. The second string of Turkish Stream or "southern route" (via Bulgaria) connecting to TAP or ITGI are possible but not likely by 2020

Global LNG supply: existing & FID/under construction 2008-2020



Source: Rogers/Ledesma OIES

• In a surplus global LNG market 2016-2023 (??):

- Europe could be the recipient of substantial LNG supplies (even if not actively seeking them)
- Gazprom would need to compete against these supplies at prices which could go as low as HH + \$2/mmbtu
- Failure of Gazprom to compete could lead to significant additional LNG supplies arriving in Europe which would significantly reduce dependence on Russian gas (at least for the duration of the surplus)

• But this will be time-limited as global LNG supply/demand may tighten by early/mid-2020s

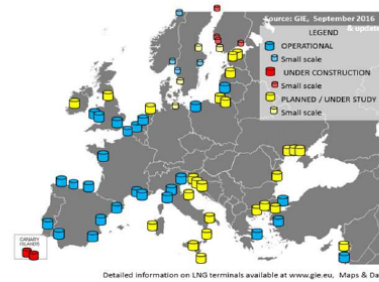
- LNG will disappear when Asia needs it & ...
- Dependence on Russian gas might increase

• By the mid-2020s: Russian gas and ??

The 2016-20 period: Russia does not want a price war with LNG but this could happen & Russia is in a position to 'win' but at a cost

European LNG infrastructure: 210 bcm, 25% utilisation (2015)

- **NW & SW European countries:** access to LNG via massive regasification capacity & high level of interconnection
- **CE, SE, Baltics European countries:**
 - **The Baltics region:** with Lithuanian (4 bcm), Polish (5 bcm) & two more new LNG facilities, the Baltics & Finland could diversify away from Russian gas (up to elimination) by 2020 if agree sharing facilities & expanding interconnections
 - **SE Europe:** with (envisaged to be expanded to 7.3 bcm) Greek LNG terminal, (to be built) Croatia terminal (2 bcm), reinforcements & interconnections, and access to Italy's LNG capacity, could diversify away from Russian gas (up to elimination) by 2020
 - **CE Europe:** due to much higher demand, will depend on reverse flow of LNG from NW&SW Europe which could be limited due to infrastructure bottlenecks, could reduce (not eliminate) dependence on Russian gas by 2020
- CESEC & PCI lists appear to suggest the focus being made on developing infrastructure in SEE rather than on connecting it with already existing infrastructure in NW/SW Europe



Source: Gas Infrastructure Europe



Source: ENTSOG map, compiled by EnCT Secretariat

Ability of most dependent/vulnerable 'east' European countries to access non-Russian supplies (LNG and pipeline) has been limited by infrastructure constraints but this can be solved by 2020 – but at a cost (infrastructure cost & potential price differential)

European gas security (2015-2030): conclusions

- **Sources:** global LNG and Russian pipeline gas will be the two main sources competing for European market up to 2030. No significant new non-Russian pipeline gas for Europe before 2025, projections beyond 2025 highly speculative. Russian gas will be competitive with all other gas supplies (LNG & pipeline) in a hub-priced European market
- **Transport/transit infrastructure:** abundant LNG regasification capacity in NW/SW Europe, limited but expanding (with EU financial support) LNG capacity in CE/SE/Baltics + interconnections enabling the region's access to LNG and non-Russian pipeline gas, but the issue of transit across Ukraine post-2019 remains unresolved
- Main risks are **governmental (political), legal/regulatory, and contractual**, threatening to upset existing commercial relationships, and must be mitigated

Threat of supply & price disruptions up to 2030 from any source is acceptable for overall Europe but CE/SE/Baltics could reduce their overdependence/vulnerability by 2020 through additional infrastructure

OIES Gas Programme published research on this topic

This presentation mostly draws on:

- Stern (ed), Reducing European dependence on Russian gas: distinguishing natural gas security from geopolitics (2014)

With further update & detail available in:

- Henderson & Pirani (eds), Russian gas matrix: how markets are driving change (2014)
- Aissaoui, Algerian gas: troubling trends, troubled politics (2016)
- Pirani, Azerbaijan gas supply squeeze and the consequences for the Southern corridor (2016)
- Corbeau & Ledesma (eds): LNG markets in transition: the great reconfiguration (2016)
- Yafimava, The OPAL exemption decision (2017)

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Thank you!

www.oxfordenergy.org

Katja.Yafimava@oxfordenergy.org

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Presentation by Mr Jan Ingwersen



Brussels, 6 February 2017

ITRE Workshop on “EU Energy Independence, Security of Supply and Diversification of Sources”

Contribution of gas infrastructure to enhance security of supply

Jan Ingwersen
ENTSOG General Manager

Image Courtesy of Thyssengas



ENTSOG MEMBERS 2017



Members Map
STATUS: NOVEMBER 2015



ENTSOG was created on 1 Dec 2009 and is now comprised of:

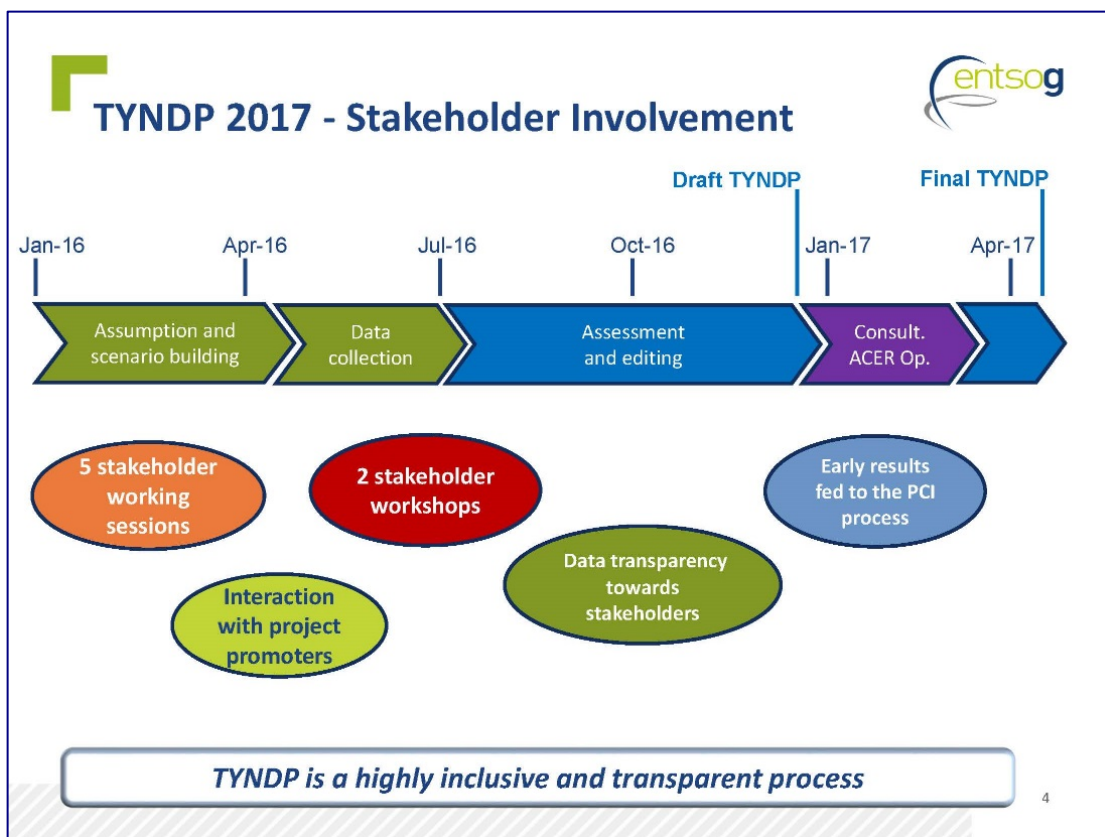
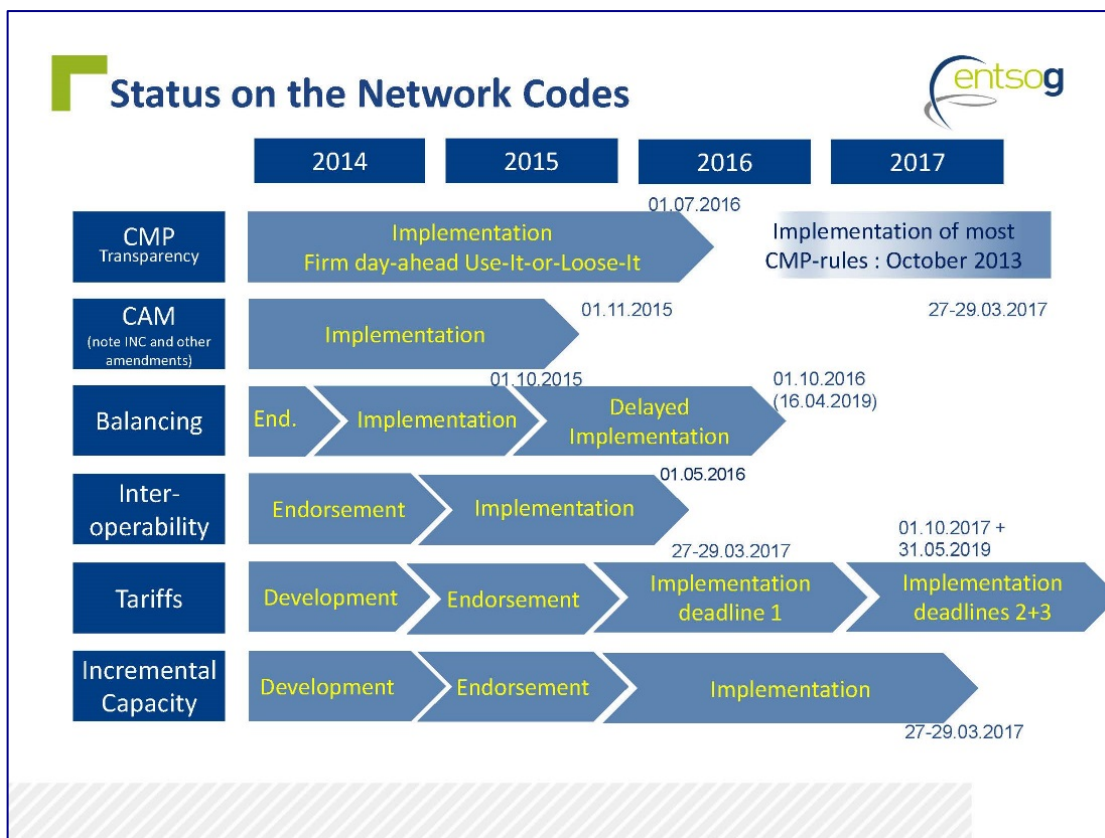
45 TSO Members and 2 Associated Partners from 26 European countries

4 Observers from EU affiliate countries:
 GA-MA AD (FYROM)
 Gassco AS (Norway)
 Swissgas AS (Switzerland)
 Ukrtransgaz (Ukraine)

AUSTRIA AND GERMANY



ENTSOG develops Network Codes, Transparency Platform, RCSG, TYNDPs, Winter/Summer Outlooks etc.



Existing EU Gas Infrastructure



- **Well-developed EU transmission network**
- **Diversified pipeline imports**

55 projects
commissioned
since first
TYNDP



- **LNG terminals**



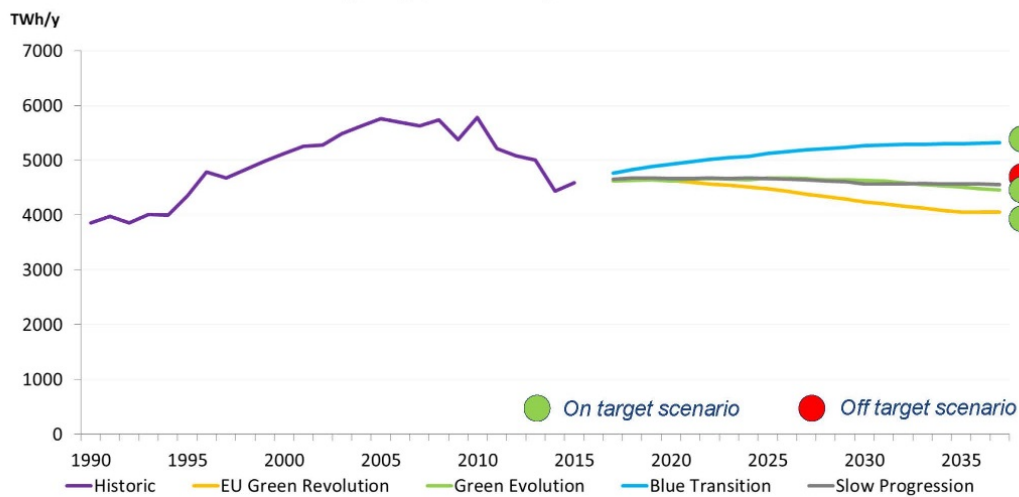
- **Underground storages in most EU countries**

5

Gas Demand – Historic & Scenarios



Scenarios set the range of possible futures



Scenario data is country specific and builds on national input and expertise

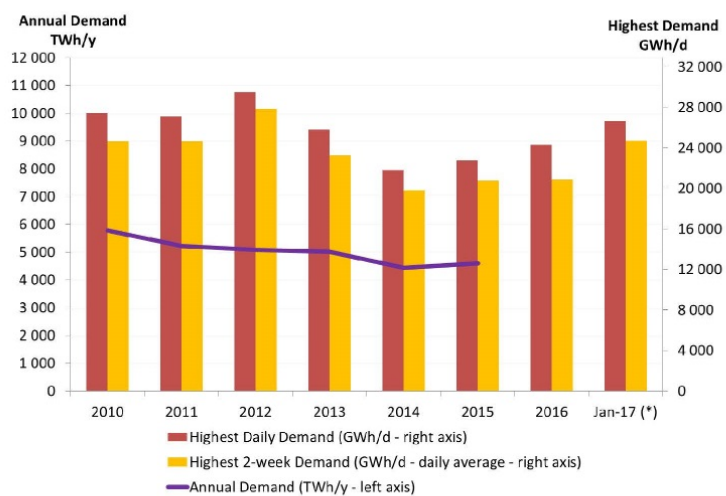
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Gas Consumption & Peak Demands



The gas infrastructure is designed to cope with peak demand situations.

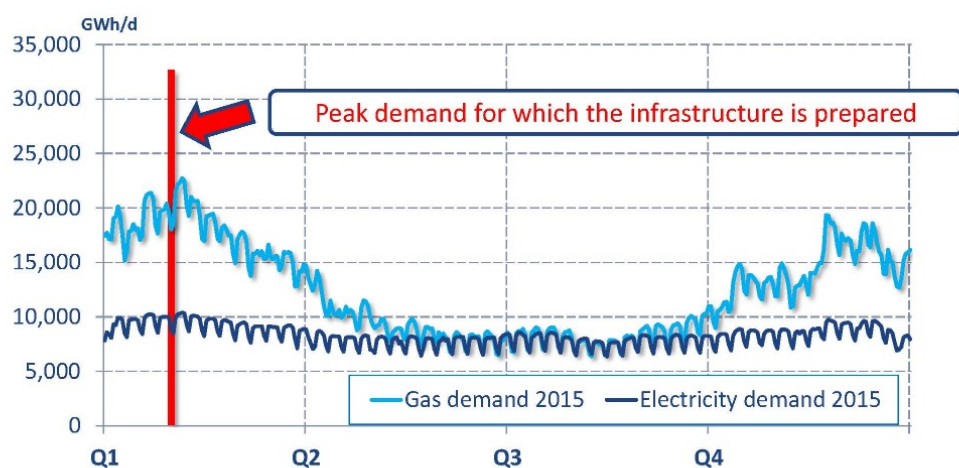


* January 2017 up to 18th January

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Coping with Peak Demand



Peak demand is a main criteria for gas infrastructure design

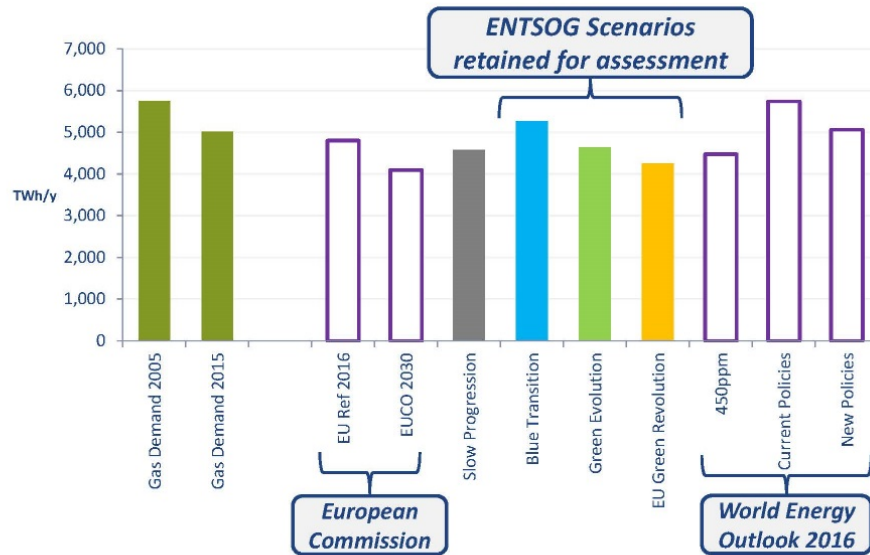
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Gas demand – Scenarios 2030



ENTSOG Scenarios compare to other scenario sources



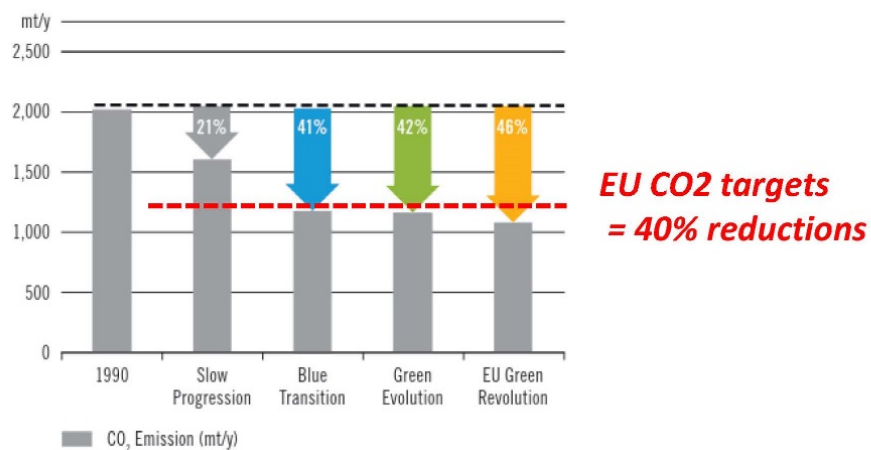
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TYNDP 2017 - CO₂ Reductions

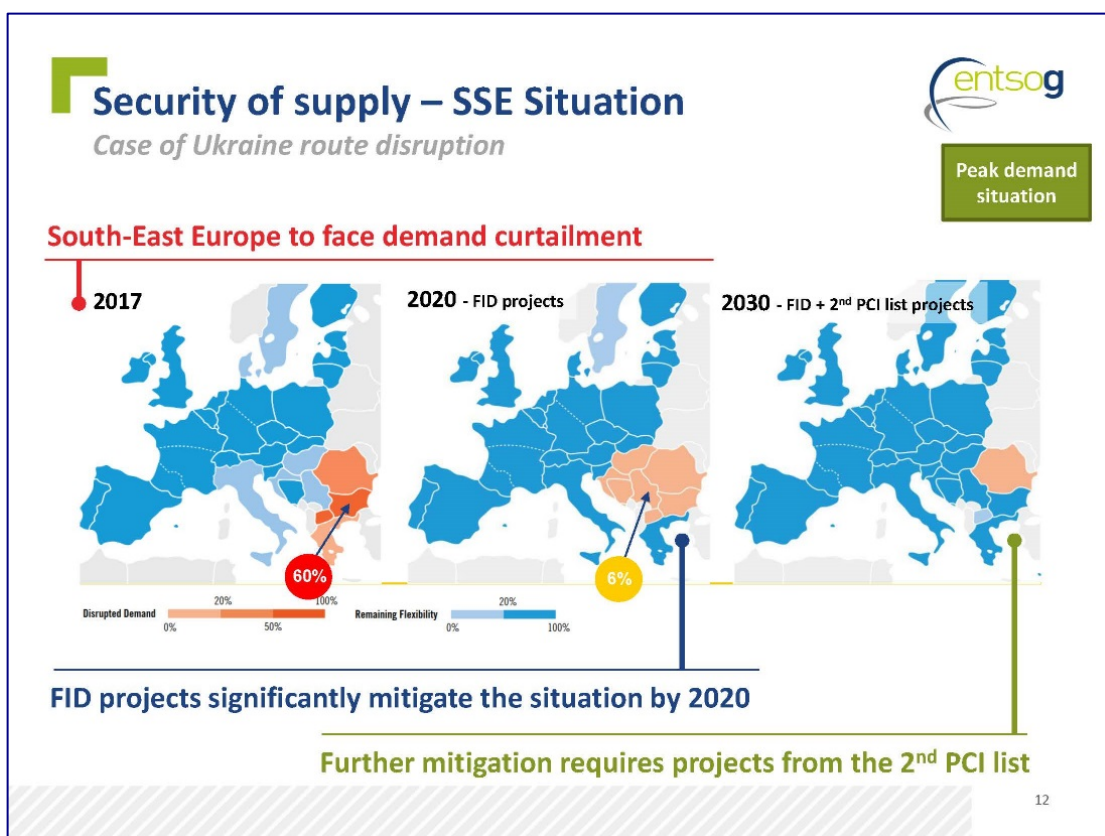
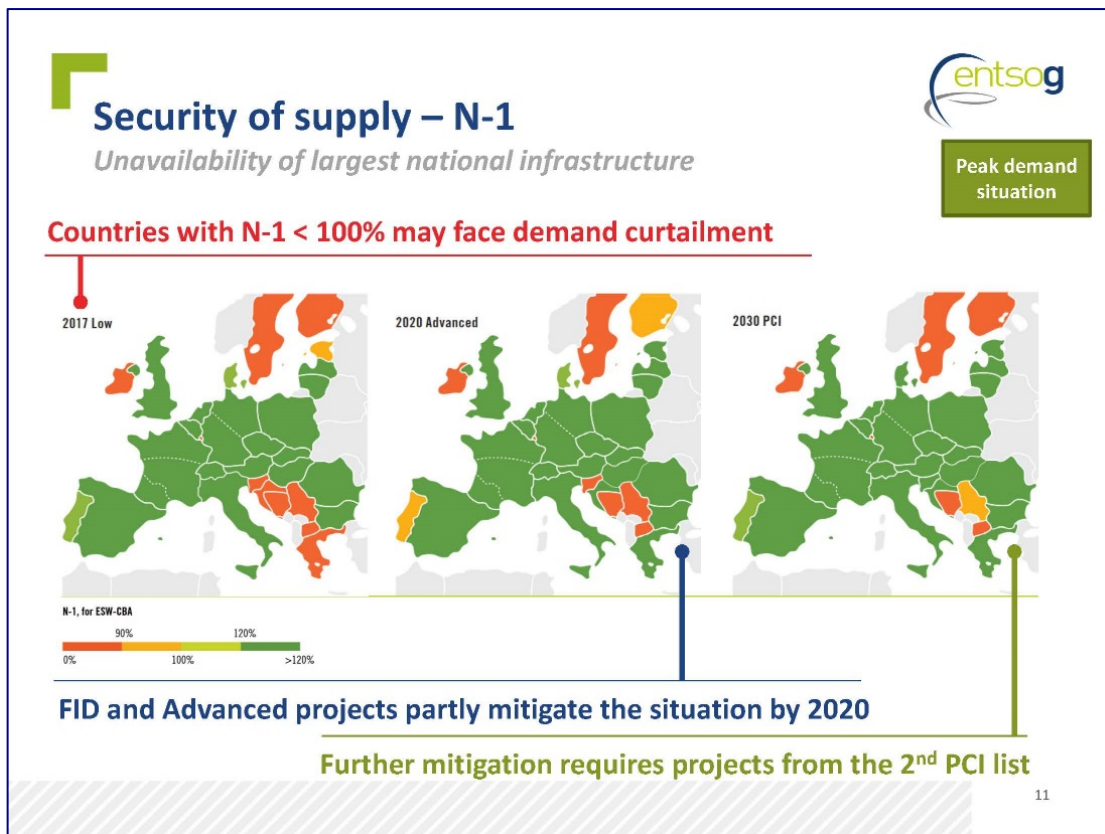


Gas displacing coal strongly improve CO₂ Reductions



CO₂ savings in 2030 – overall power sector and gas end-user demand

10



Security of supply



Already achieved:

- Resilience to extreme temperatures
- Resilience to disruption of Algerian, Libyan and Norwegian supply sources

Further infrastructure needs:

- To mitigate Belarus route disruption risk in North-East Europe
- To mitigate Ukrainian route disruption in South-East Europe
- To mitigate N-1 risk in specific countries

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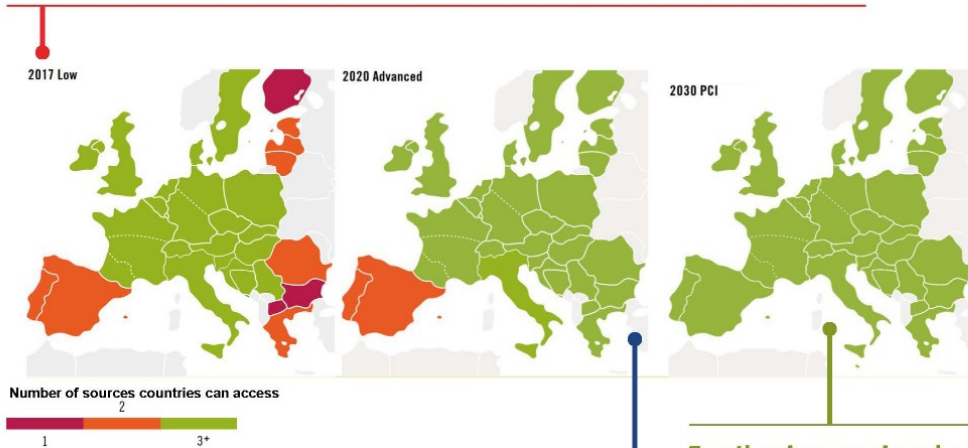
Market Situation

Supply diversification



Whole year

Several areas have a significant access to only 1 or 2 supply sources



FID and Advanced projects ensure access to at least 3 supply sources in Baltics and South-East EU

For Iberian peninsula
2nd PCI list projects allow
further diversification

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Market Development



Already achieved

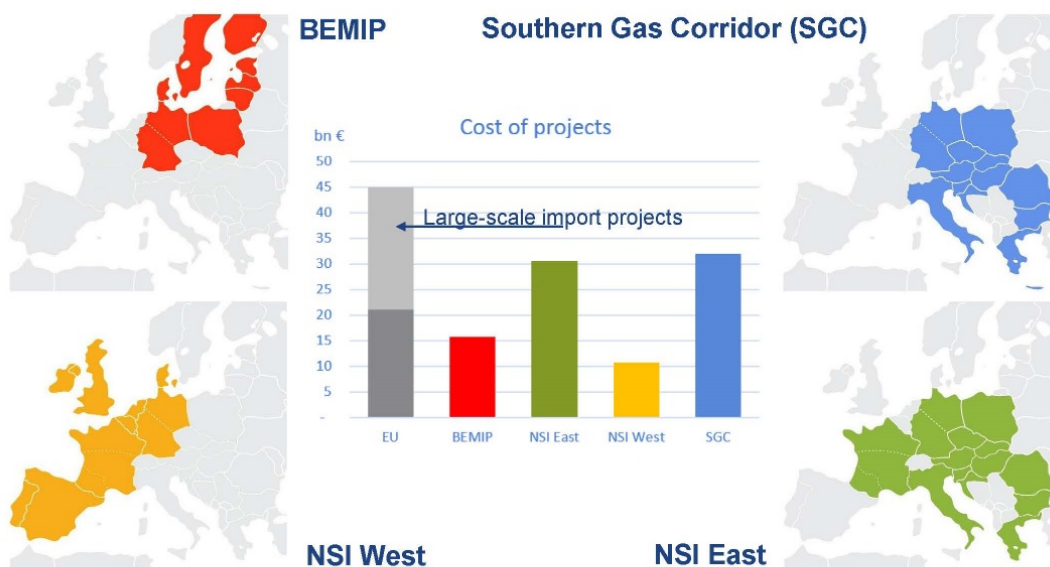
- Most of Europe has access diversified supply sources
- Hub price convergence most of the time - especially in Western Europe

Further infrastructure needs

- To ensure more diversified access to supply sources in the Baltics, South-East Europe and Iberian Peninsula
- To mitigate high dependence of one specific supply source

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Potential Projects Included in TYNDP 2017



Total potential investments: 45 bn€ (FID and Advanced)
 - Of which large-scale import projects (TANAP, TAP and Nord Stream 2): approx. 24 bn€

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Gas Infrastructure - Summary



The EU gas infrastructure is well developed

- *Transports large energy volumes across EU*
- *Capable of handling high peak demands*
- *Supports free flow of gas and competition*
- *Resilient to supply interruptions*
- *Close to achieving EU internal gas market goals*
- *Ready to support a low-carbon future*

Assessing need for further infrastructure requires energy scenarios covering a range of possible futures

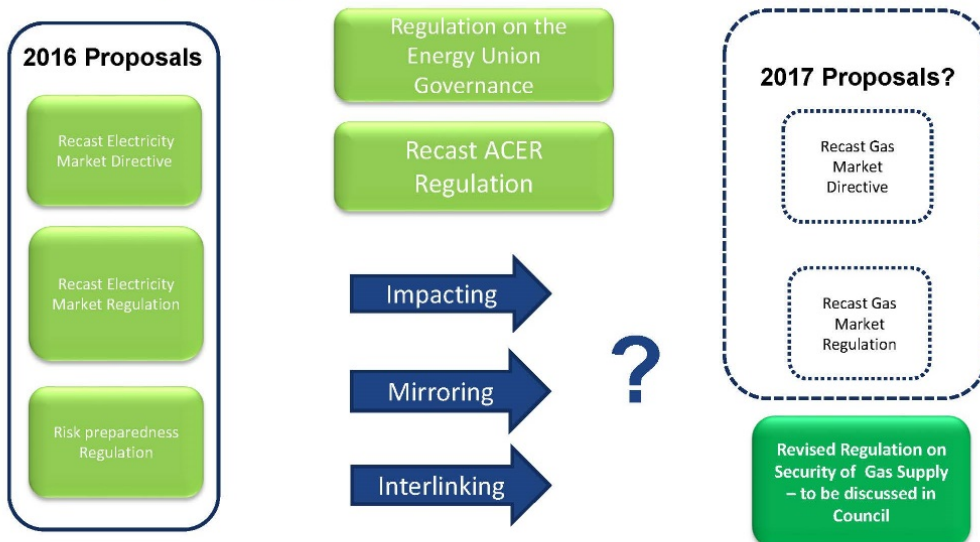
The supply situation is not the same all over Europe

- *In specific areas, further infrastructure is still needed – to ensure energy supplies, security of supply and competition*
- *Necessary projects are to be commissioned in the coming years*

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EC Winter Package – ACER & Electricity Regulation - also impacting gas sector



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EC Winter package – Views on Gas Related Issues



Direct as well as potential indirect consequences (mirroring)

> Changing network code development & amendment process?

- Extensive involvement of EU institutions, gas TSOs, stakeholders etc. is already established
- Maybe need to consider strengthening ACER's coordination and alignment of the NRAs
- Avoid "last word" to ACER in Network Codes processes
- Consider proper stakeholder and ENTSO involvement in process for amendments

> Changing mission statement for ENTSGs to emphasize the European perspective?

- ENTSGs mission statement already includes a European mandate
- Achievements of ENTSG confirm the commitment of the gas TSOs to the European agenda
- A codified mission statement may have unforeseen consequences – i.e. regarding ENTSGs staffing secondment principle as well as on TSO commitment in general

> Additional transparency requirements?

- ENTSG ready to consider further transparency – carefully balancing to the efficient and pragmatic organization of the work in the association

ENTSOG is ready to further contribute to the debate on these topics

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Thank You for Your Attention

Jan Ingwersen
ENTSOG General Manager

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WWW: www.entsog.eu

Presentation by Mr Tomislav Jureković



ITRE Workshop
*EU Energy Independence, Security of Supply and
Diversification of Sources*



**The regulator's view on Europe's energy dependence
and
the role of LNG to improve security of supply**


Tomislav Jureković
Vice-President, CEER
President of the Board of Commissioners, HERA

European Parliament, Brussels, 6-March-2017

Croatian Energy Regulatory Agency, Ul. grada Vukovara 14, 10000 Zagreb, Croatia www.hera.hr **1**



Contents



- Europe's energy dependence
- Current thinking on security of gas supply
- LNG in the context of security of gas supply – two aspects of flexibility
- Regulatory analysis of the role of LNG in improving security of gas supply
- New LNG infrastructure in EU
- Challenges ahead

Croatian Energy Regulatory Agency, Ul. grada Vukovara 14, 10000 Zagreb, Croatia www.hera.hr **2**



Europe's energy dependence



- **Dependence on external sources in fossil components of EU energy mix - a well-recognized trend**
- **Ultimate choice of energy-mix (as well as ultimate responsibility for security of energy supply lying with MSs)**
- **Major impacting measures:**
 - **DIVERSIFICATION/DIVERSITY**
 - **Fully operational INTERNAL ENERGY MARKET**
- **EU energy strategy goals ultimately leading towards mitigating the effects of the dependence trend**

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Major lines of current EU thinking



- **Energy Union strategic frame (Mar-15)**
- **EC Communication „European Energy Security Strategy” (May-2014)**
- **EC proposal for a new Regulation concerning measures to safeguard the security of gas supply (Feb-16) – repealing Reg (EU) No. 994/2010**
- **EC Communication on an EU strategy for LNG and gas storage (Feb-16)**
- **EP Resolution on EU strategy for LNG and gas storage (Oct-16)**

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Recent contributions of the EU regulatory community



Security of gas supply

- **CEER Concept Paper on Security of Gas Supply** (CEER concept paper by GWG SoS TF – Sep-16)
- **CEER Priorities for the Revision of Regulation 994/2010** (CEER paper by GWG SoS TF – May-16)

LNG

- **CEER Analysis on the role of LNG to improve security of supply** (CEER Report by LNG TF – Feb-16)
- **CEER response to the EC's strategy for LNG and gas storage** (May-16)

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5



Value of LNG in the SoS context



- **LNG has been a key driver of gas supply diversification for EU for 15+ yrs** (and the principal instrument of gas market globalisation)
- **In the context of SoS, EU has considered LNG as a key source of flexibility** (and the main alternative to historic gas suppliers)
- **Total SoS-value of the LNG supply chain has to be viewed through both its infrastructural components (assets) and its *per se* business i.e market model**
- **In pure market terms, LNG is (similar to gas storage) a prime provider (tool) of market flexibility**
- **The role and value of LNG in the SoS context has to be considered in light of the characteristics of the LNG chain (upstream rigidity vs. downstream/terminal flexibility)**

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Regulatory assessment of the future role of LNG in EU gas supply



Objectives:

- **Can LNG be mobilised to reinforce security of supply (SoS) from the short term to the long term ?**
(bearing in mind the expected transition to more dynamic and flexible LNG markets)
- **How can LNG be included in regional concepts of SoS ?**
- **What are the potential (regulatory) risks ?**

Basic assumptions:

- **Regulation should ensure effective response** of the internal energy market to both endogenous and external supply risks
- **Basic regulatory concepts/priorities for the new SoS frame apply**



Conclusions of regulator's analysis



- **LNG is a key source of gas supply diversification** – taking account of the LNG chain structural characteristics
- **More information and transparency** are the key to market liquidity and consequently to enhanced SoS
- **Explore the idea of a common European LNG exchange platform** (possibly accompanied by standardized agreements by LNGSOs, master pre-agreements by suppliers and users, ...)
- **More flexible** LNG technologies and business concepts hold promise
- **Reinforce the role of LNG markets in Emergency Plans** – in particular on **regional** level (along the market-based principles for ensuring SoS)
- **Increase cooperation** between competent authorities, LNGSOs and TSOs at EU level



New LNG infrastructure in EU



- „EC Strategy for LNG and gas storage” → drive towards completing the „missing” LNG-related infrastructure in EU
- SoS-related concerns have complemented (or supplanted?) pure market-based reasoning
- The drive is happening in the context of a general decline in gas demand
 - EU gas demand has bottomed-out in 2015
 - however, not clear if this is a permanent rebound or will the challenge remain: „how to manage an energy source in decline?”
- EU regulators advocate market-based measures and mechanisms in SoS-related concepts, but
- Could the on-going considerations on new market model and security of supply move the other way on gas infrastructure?



Infrastructure development: One size does (not) fit all



or: Not all LNG terminals are created equal.

- EU LNG terminals have been (and are being) developed in different infrastructural/supply contexts – with different business models
- Case-by-case approach more promising
- Full 3rd package implementation (with implemented NCs) could/should lead to market mechanisms as clearer demand identifiers

Current thinking seems to be evolving towards the size of the „control volume of benefits” as the main driver for LNG investments.



A case in point: a brief on the Croatian LNG terminal project





- Third-life of the (geographically) exceptionally well positioned project for development of a LNG receiving terminal on the Croatian island of Krk – project promotor „LNG Croatia Ltd“
- **Demand security** a challenge for national regulatory model – ultimately FID
- Strong general (political) support – yet challenging economics in the environment of stagnating gas demand
- Project has received PCI and CESEC status – distinct **regional context of security of supply**
- National TSO with a robust asset base and high transmission tariff – cost/demand on the verge of a positive feedback loop
- Regulators invited/expected to provide regulatory support



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Challenges abound



- **New geopolitical realities**
(might influence expected developments on the global LNG market)
- **Uncertainties in the future role of gas**
(might lead to further decrease of demand > leading to stranded infrastructural assets > endangering competitiveness of gas)
- **Challenge of completing the LNG-related infrastructure on sound economic basis**
(regional cooperation vital for cost-sharing and/or demand security)
- **Blending the LNG role into the commonly agreed (new) SoS frame**
- **Assuming a market-based SoS frame, providing solution(s) for the potential problem of affordability in a crisis situation**

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ITRE Workshop
*EU Energy Independence, Security of Supply and
Diversification of Sources*



THANK YOU
FOR YOUR ATTENTION !

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Presentation by Ms Coby van der Linde

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EU Gas Market Fundamentals

Prospects for a Sustainable Diversification of EU Gas Supplies



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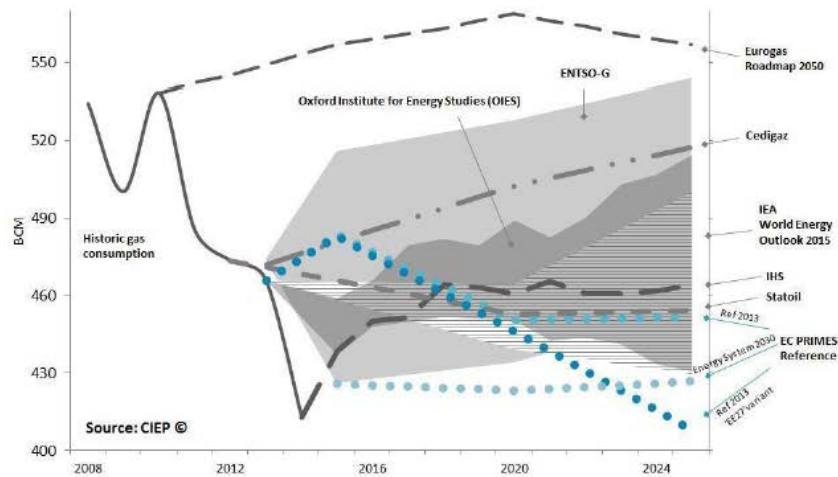
Content

- EU natural gas demand and import needs outlook
- Alternative gas import sources
 - Russia and alternative suppliers
 - LNG
- Sustainable diversification of natural gas supplies into the EU: competitive diversification

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EU Gas Demand outlook to 2025, selected scenarios

Major uncertainty, hinging on policy directions in the power sector

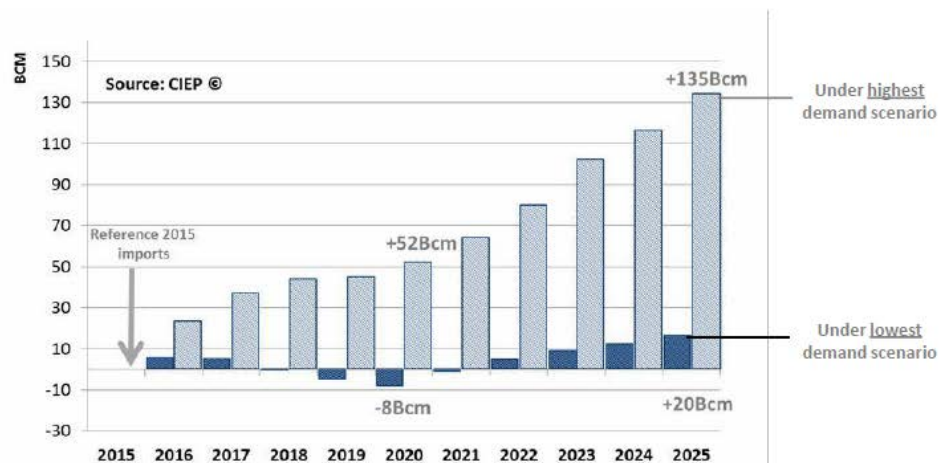


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Additional Gas Import Needs Into the EU (Reference to 2015)

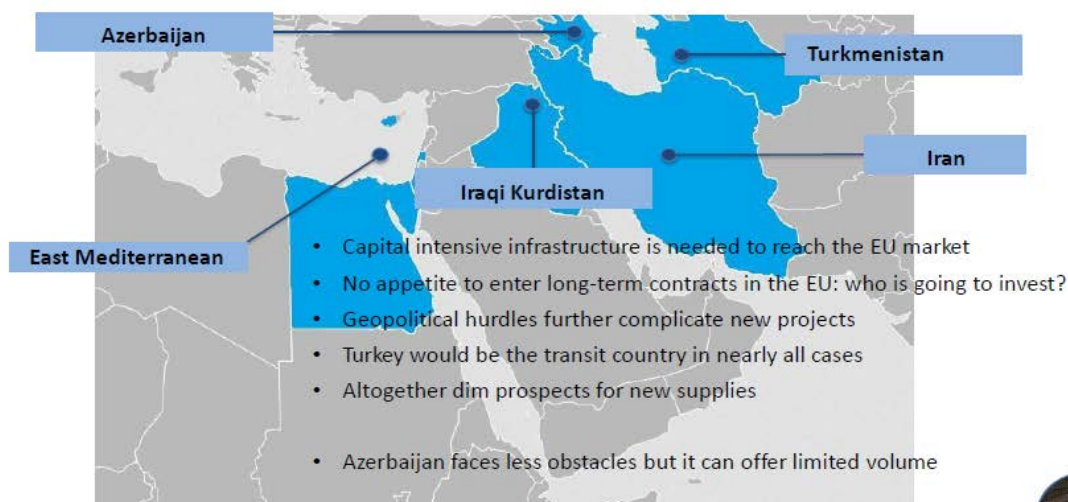
Due to declining domestic production, import needs rise in all scenarios but demand uncertainty hampers any drive to secure new long term supplies



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Outlook for Gas Imports from New Pipeline Suppliers into the EU to 2025



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Outlook for Gas Supplies from current pipeline suppliers into the EU to 2025

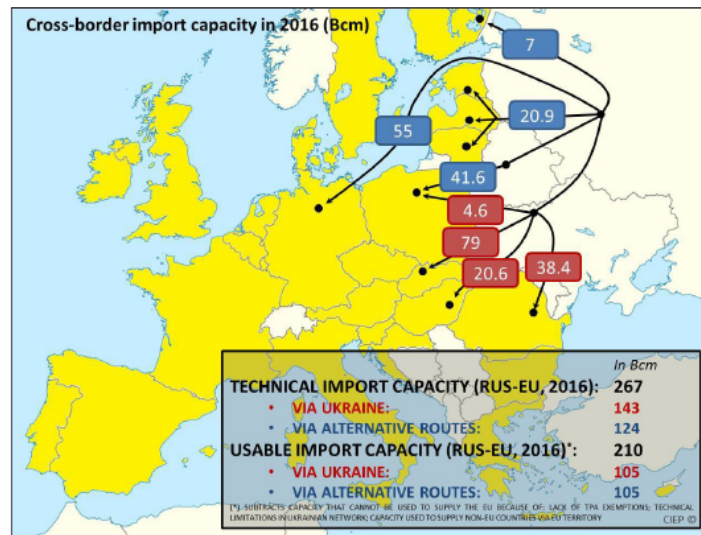
- Norway: maintaining steady supply level, potential for additional gas limited (if any) over the period under review
- Algeria: additional gas from Algeria most unlikely
- Libya: current supplies risky, no additional supplies
- Russia: only Russia has potential for additional supplies

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Outlook for Gas Imports from Russia into the EU to 2025

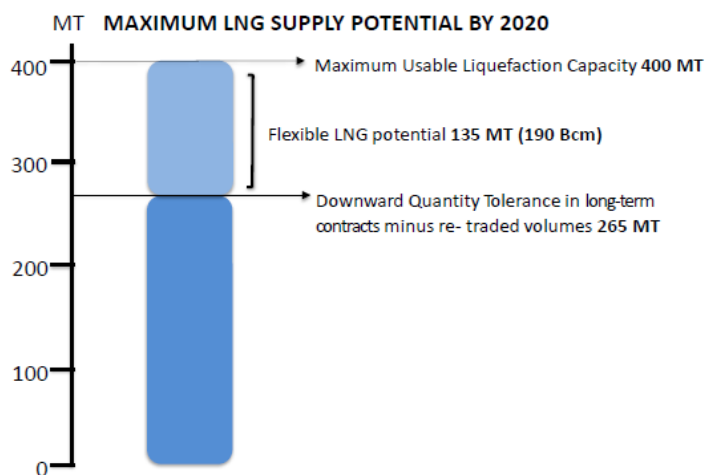
- Russian gas is very price competitive
- In 2025, contracted volumes will be around 150 Bcm, but the 'floor' is set by take-or-pay commitments (100-125 Bcm)
- Russia has at least 100 Bcm of spare supply capacity above its contracted volumes
- Transport as potential bottleneck



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Flexible Volumes in the Global LNG Market



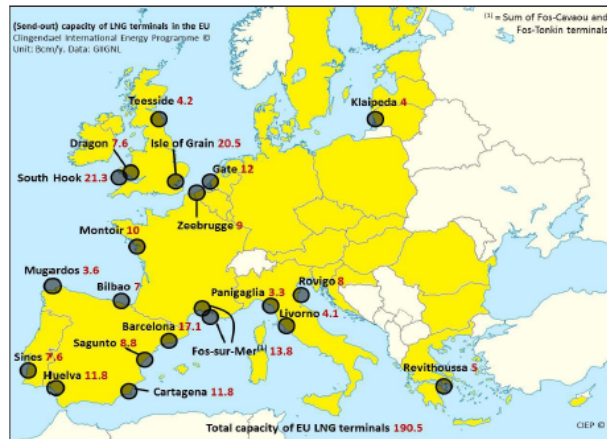
- Additional Australian and US LNG by 2020
- Flex LNG potential in 2020: 190 Bcm
- Amount of Flex LNG potentially available to the EU will depend on demand from other markets
- LNG market to remain glutted until 2023-2025
- FIDs needed in the next years to avoid a tight market in 2025
- Portfolio players can play a role in bridging the needs for flexibility and FID security

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LNG Import Terminals in the EU

- EU continues to play the role of 'sink market' but its absorption capacity is not endless

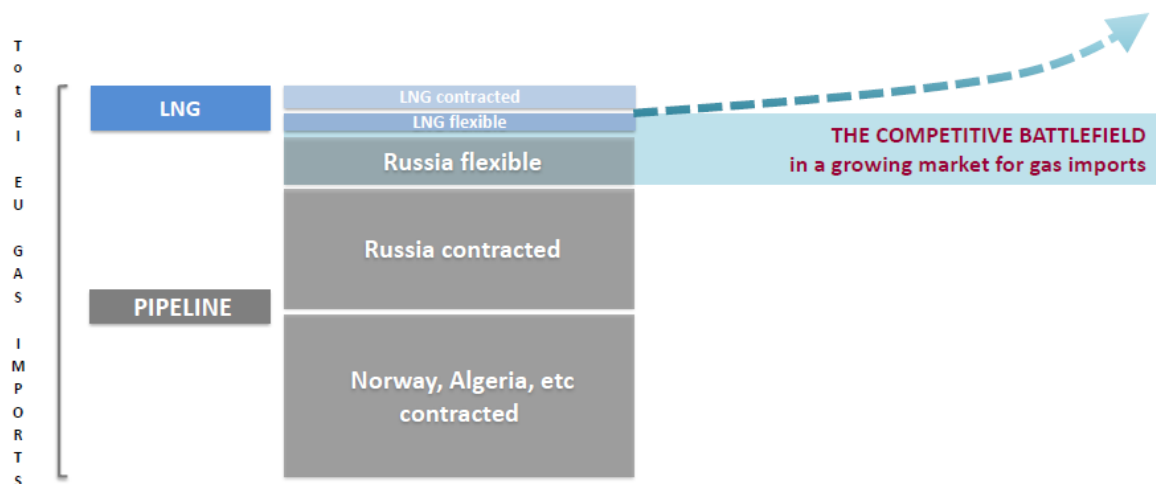


- Additional flexible LNG will come to Europe and can be accommodated by considerable idle capacity in import terminals (45 Bcm used of 190 Bcm available)

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The EU Gas Import Battlefield *



* Figure constructed to scale based on 2015 gas imports into the EU

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Based on these EU Market Fundamentals what are then the
**Prospects for Security of Supply and Sustainable Diversification
of EU Gas Supplies until 2025?**

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Types of Security of Supply Definitions

OPERATIONAL

Capacity to
accommodate daily
variations in demand
(extreme winters)

STRATEGIC

Strategy to limit risk
and impact of
interruptions (at source
or infrastructure) in
supplies at lowest costs
and competitive prices

GEOPOLITICAL

Capacity to reduce
probability or impact of
major supply
interruptions

LONG-TERM

Conditions ensuring
adequacy, affordability
and security of supply
over the long term

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Security of Supply for the EU

Traditional security solutions

STRATEGIC

- **Supply diversification** (based on long-term contracts)
- Contractual diversification
- **Multiple import facilities**
- **UGS**

GEOPOLITICAL

- **Supply diversification**
- Relationship management,
- and/or strategic stocks

LONG TERM

- **Additional, diversified long-term contracts**
- Contractual diversification
- Multiple import facilities

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Security of Supply for the EU to 2025

Security outlook for current and, if needed, additional supplies

STRATEGIC

- **COMPETITIVE DIVERSIFICATION:** Overhang of LNG supply and Russian gas supply capacity, supported by alternative spare import facilities* offers optionality in the market;
- Multiple import facilities
- UGS

GEOPOLITICAL

- Supply diversification
- Relationship management
- and/or strategic stocks
- **Complemented by COMPETITIVE DIVERSIFICATION**

LONG TERM

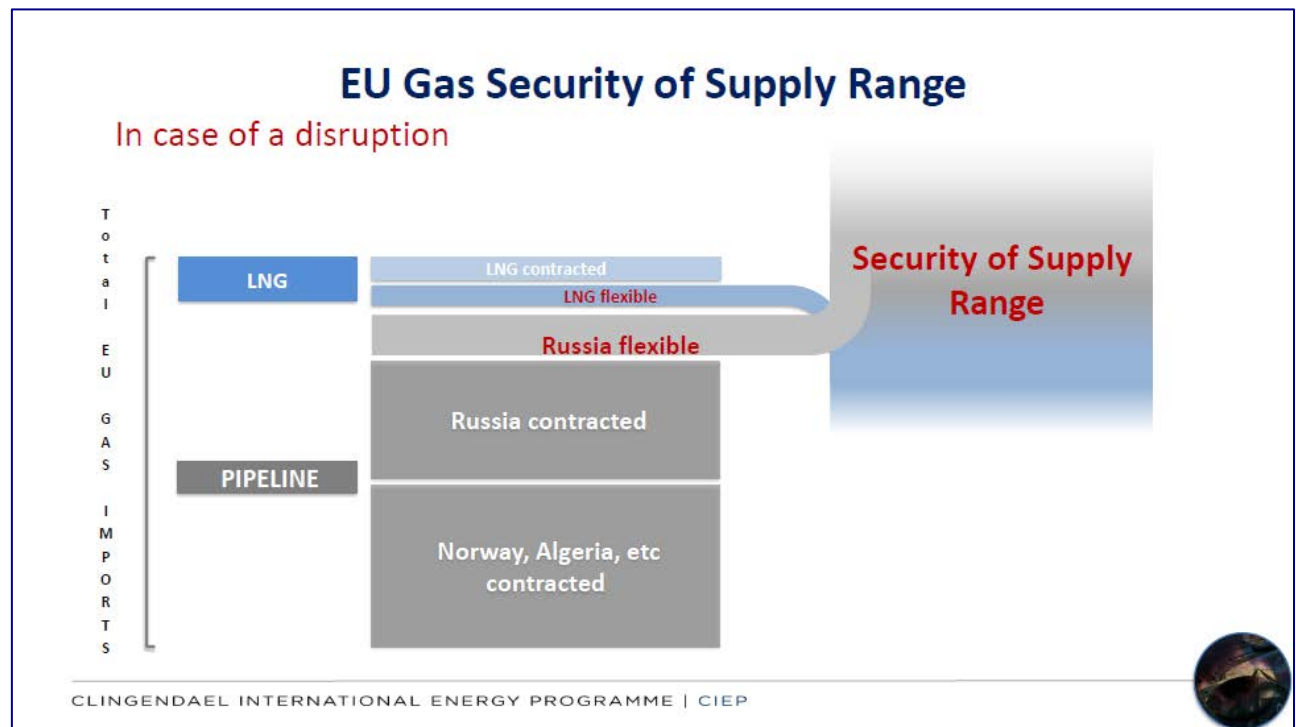
- ~~Additional, diversified long-term contracts~~
- **COMPETITIVE DIVERSIFICATION**

No appetite in EU market

*Currently limited import pipelines from Russia

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Prospects for Sustainable Diversification of the EU's Gas Supply

Conclusions

The EU is enjoying a prolonged buyers' market

- Significant **supply overhang** of both pipeline gas and LNG, combined with market liquidity
- 'Competitive diversification' will offer **price competition and supply security**
- The **market share** of any supplier is **irrelevant**
- **Minimising obstacles to competition** will enhance competitive and security environment (this includes allowing additional import pipeline capacity investments from Russia)

But the "holiday" (for the EU and its consumers) does not last forever

- **The EU is not in a position to dictate the nature of the market**
- **Timely review needed** for signs of changing LNG supply/demand and business model outlook
- If Asian and/or LNG business models change to short term transactions, LNG supply to EU in a tight market will depend on EU gas prices
- If LNG supply gets tight while Asia resumes term contracts to secure new supplies, **EU will be ill-prepared to do the same (weakness of the EU buyers)**

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NOTES

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